Spring 2012

Quality safety assessment/application for nurses (QSAAN)

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Final Project/Thesis

Disclaimer

Quality Safety Assessment/Application for Nurses (QSAAN):

Translation of QSEN Competencies in the Practice Setting

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Submitted as partial fulfillment for the Doctor of Nursing Practice Degree

Regis University

April 9, 2012

Executive Summary

Healthcare quality and safety carries the burden of perfection in a complex, imperfect practice environment and is a national priority (Institute of Medicine (IOM), 1999; 2011). Currently, application of Quality Safety Education for Nurses (QSEN) competencies is seen primarily within academic settings and has been studied in one segment of practicing nurses; pediatric oncology nurses (Dycus & McKeon, 2009).

Problem
The Quality Safety Assessment/Application for Nurses (QSAAN) project addresses how QSEN competencies apply to the acute care practicing nurse setting. The PICO research question for QSAAN is; **P:** for all levels of practicing nurses in an acute care setting, **I:** does an assessment of Knowledge, Skills and Attitudes (KSA) via the QUISKA2 tool (Dycus and McKeon, 2009), **C:** as compared to QSEN expected competencies, **O:** describe the self-report of knowledge, skills and attitudes related to the topics of Patient Centered Care, Teamwork and Collaboration, Evidence-Based Practice (EBP), Quality Improvement (QI), Safety and Informatics.

Purpose
This descriptive survey study measures the KSA of practicing nurses compared to QSEN competencies; conducts psychometric evaluation of a tool to measure translation of QSEN into practice; and provides feedback to academic partners about QSEN competencies in practice.

Goal
The primary goal for the QSAAN project is to facilitate the promotion and provision of improvement of quality safety practice for nurses in the acute care practice setting.

Objectives
The objectives of QSAAN are to: 1) obtain a baseline self-assessment of practicing nurse's KSA related to QSEN competencies; 2) facilitate translation of knowledge about QSEN competencies to the practice setting; 3) provide feedback between academia and practice related to QSEN competencies; 4) develop a tool that can be used in the practice settings for assessment of KSA of QSEN competencies; and 5) improve the quality safety environment for practicing nurses.

Plan
QSAAN is a replicate descriptive survey study expanding upon the work of Dycus and McKeon (2009). The QUISKA2 tool was revised for the acute care setting and reviewed by an expert panel. All levels of practicing nurses (n=2060) from four acute care hospitals were invited to participated in a self-assessment survey research project utilizing the QUISKA2 tool.

Outcomes and Results
Survey participants included 668 nurses or 32.43% of eligible nurses. Descriptive statistics for demographics were completed. The inter-item correlation coefficients of the QUISKA2 was 0.94 (p = <.001). Nurses had highest familiarity with Patient Centered Care (5.5 ± 0.584) and lowest for Evidence Based Practice (3.29 ± 0.555). Differences were noted at (p =<.001) for nursing role, level of education, unit of work, and prior QI training; other results were certification (p = 0.015), facility (p = 0.024) and years from nursing school (p = 0.005). Future plans include targeted education on QSEN domains and development of quality safety competencies for practicing nurses.

Acknowledgements

It is with heartfelt thanks that I acknowledge the people who made the dream of this Capstone Project and a Doctoral of Nursing Practice a reality. I would like to acknowledge the nursing instructors at Regis University who had the vision to start a Doctor of Nursing Practice program and to allow pioneers of the program to partner with you as the program unfolded. Extra gratitude goes to Dr. Barbara Berg who served as my advisor and mentor, to Dr. Marcia Gilbert who helped me navigate several Institutional Review Board adventures and to my capstone chair Dr. Lora Claywell who helped to encourage me through the Capstone.

I wish to acknowledge Dr. Paula Dycus, Dr. Leslie McKeon and Dr. Gale Armstrong for serving on the instrument review panel and offering expert advice on QSEN competencies.

To my classmate Julie Benz, I thank you for the advice and the camaraderie of our DNP journey. But most especially, for serving on my team which allowed me to complete research at my fourth research site! To Dr. Cynthia Oster, my colleague and doctoral mentor, thank you for helping me to see the value in this project and degree. And to my statistician, Mary Siegrist, I wish to acknowledge your expertise and coaching in assuring thorough and accurate data analysis and helping me to see the beauty in numbers.

Special acknowledgement goes to Dr. Sharon Pappas who served as my clinical preceptor and mentor throughout this process. You had confidence in my ability to see this project come to fruition and challenged me to always do my best.

Finally, I wish to acknowledge my family who supported me through this adventure and believed in my potential. And to my husband, Jim, my heartfelt *thanks* for being my sounding board, my coach, my friend. You always believed in me, even when I did not. I could not have achieved this work without your support.

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Quality Safety Assessment/Application for Nurses (QSAAN): Translation of QSEN Competencies in the Practice Setting

Healthcare is a multibillion-dollar public service business that is a substantial portion of our nation's economy (Waldman, Smith, & Hood, 2003). Healthcare is not just a public service; rather it is an industry in itself. As a business, the financial aspects of healthcare cannot be viewed in isolation without reflection on quality. It is the quality component of healthcare that is the focus of this project. Healthcare quality and safety carries the burden of perfection in a complex, imperfect practice environment. As an industry, healthcare has identified quality and safety as a priority (Institute of Medicine [IOM], 1999); and healthcare has looked to other industries such as the aviation industry to guide changes to improve the practice environment (Pronovost & Vohr, 2010; Sherwood & Drenkard, 2007). To add further credence to the importance to this quality safety focus financial reimbursements for care are now tied to demonstrated outcome performance and prevention of avoidable adverse events (Pappas, 2009).

The healthcare workforce is made up of a number of different disciplines, with registered nurses the largest of these numbering 2.6 million jobs (Bureau of Labor Statistics [BLS], 2011). By virtue of being the largest employee workforce within healthcare, nurses play a significant role in providing safe, high-quality care (BLS; IOM, 2011). The Institute of Medicine (IOM) identified that a logical starting point in the path to improve quality for nursing care was with the preparation of students who will be the future of nursing care (2003). The Quality Safety Education for Nurses (QSEN) program was initiated in response to the recommendations from the IOM (1999; 2003; Cronenwett et al., 2007). The QSEN project team designed a new nursing curriculum for prelicensure preparation of nurses to incorporate six domains of competency of

practice that apply components in the current healthcare environment with a distinct focus on quality and safety (Cronenwett, et al, 2007.). The QSEN program is led by researchers from the University of North Carolina and the American Association of Colleges of Nursing (AACN) and includes partners throughout the United States (Cronenwett, Sherwood, & Gelmon, 2009). This program has been piloted in several academic settings in the United States and is currently in stage III development which includes expanding the program by teaching nursing professors and academic nursing programs from around the country.

The IOM has recommended that not only nursing education programs address quality and safety, but also the entire profession including nurses in the practice setting (IOM, 1999; 2011). At this time, the application of QSEN competencies is seen only within the academic setting. The Quality Safety Assessment/Application for Nurses (QSAAN) practice issue will study how the application of QSEN competencies will reflect the current knowledge, skills and attitudes of practicing nurses. The translation of the QSEN project to the practice setting will enable the practice setting to develop competency assessment on the six domains of practice and allow for feedback for the applicability of identified competencies in the practice setting. This feedback mechanism will support the professional practice of nursing, a goal that is foundational for this project.

Problem Recognition and Definition

Translating individual components of QSEN competencies to the practice arena is not well documented, nor easily converted (Chenot & Daniel, 2010). However, the translations and feedback between nursing academia and nursing practice serves to enhance future practice for the nursing profession. The American Association of Colleges of Nursing has identified the role

of Doctorate of Nursing Practice (DNP) as a collaborative partner that serves as a leader in translation of research into practice and dissemination of evidence-based practice (Zaccagnini & White, 2011). This project will demonstrate two of AACN's recommendations for the DNP role: the first as an evaluator of evidence based practice and the second as leadership in demonstration of organizational outcomes through managing clinical care and health systems (Chism, 2010). Specifically, the translation of the QSEN identified competencies from student nurses to practicing nurses will include evaluation of the evidence-based practice competencies identified in QSEN and the systematic application of quality safety competencies as a template for nurses in practice. Identification of quality safety outcomes will benefit the practicing nurse and acute care facilities through a standardized assessment of nursing competencies. However, not all of the QSEN competencies are easily visualized as the state of current practice for nurses in the practice setting, thus the need for the QSAAN project.

Problem Statement with Identified PICO

In order to understand the QSAAN project, it is also necessary to have a clear understanding of the problem statement. The problem statement that will be used in the QSAAN project is designed in a PICO format. PICO reflects the P or population, the I or the intervention, the C or the comparison treatment or product, and the O which is the outcome.

The QSAAN project will utilize the following PICO question:

P: for all levels of practicing nurses in an acute care setting,

I: does an assessment of Knowledge, Skills and Attitudes via the QUISKA2 tool,

C: as compared to QSEN expected competencies,

O: describe the self-report of knowledge, skills and attitudes related to the topics of Patient Centered Care, Teamwork and Collaboration, Evidence Based Practice (EBP), Quality Improvement (QI), Safety and Informatics.

Project Significance, Scope and Rationale

The QSAAN project is a descriptive survey study including a self-assessment survey by current practicing nurses against the identified competencies of QSEN domains. This assessment of competencies will include the self-assessment of knowledge, skills, and attitudes related to the six domains of QSEN including: Quality Improvement, Safety, Evidence-Based Practice Teamwork and Collaboration, Informatics, and Patient Centered Care. The assessment tool in the QSAAN project is titled QUISKA2 (Dycus &McKeon, 2009) and will be described in detail later in this paper. An additional analysis evaluates the correlations between knowledge and level of nursing leadership. One of the assessments will determine correlations between level of leadership and application of the QSEN competencies within the different levels or roles of nursing leadership. Similarly, comparisons of outcomes between nurses who work in various practice settings will be analyzed to determine if location impacts knowledge, skills, and attitudes related to the QSEN competencies of the participants. The knowledge gained in these additional assessments will be utilized to give feedback to the academic setting, but more importantly to provide for the next stage of translation to practice and completion of competencies for quality and safety specifically for practicing nurses in the acute care setting. Establishing a tool that can assess practicing nurses knowledge and skills around quality safety topics is the first step in a continuum for quality safety improvement for the practicing nurse setting and will fulfill the assessment component of the QSAAN project.

Theoretical Foundation

Theoretical support for translating educational research into application to practice is found in the theoretical underpinnings of Florence Nightingale who promoted patient centered care, global thinking, and environmental awareness (Dossey, Selanders, Beck, & Attewell, 2005). Neuman's Systems Model Theory will also be utilized to support analysis of relationships between education, patient care, and healthcare outcomes within a wholistic viewpoint (Tomey & Alligood, 2002). In addition, the middle-range Theory of Nursing Intellectual Capital (Covell, 2008) and High Reliability Theory (Riley, 2008) will be incorporated as support to describe integration and application into complex healthcare institutions.

Nightingale's theory supports this project through a patient centered, research based approach. Nightingale's words related to observation and critical thinking written 150 years ago apply to nurses today and provide the foundation of quality and safety in modern healthcare. "Let people who have to observe sickness and death look back and try to register in their observations the appearances which have preceded relapse, attack, or death, and not assert that there were none, or that there were not the *right* ones" (Nightingale, 1860, p. 119). This project has a theoretical foundation that empowering the nursing workforce will promote better quality and safer healthcare. This was Nightingale's vision. Nightingale also endorsed and envisioned health promotion through a distance learning community with a global education focus for individual, community, global connections (Dossey et al., 2005).

Neuman's theory supports this practice issue as a wholistic approach, acknowledging the integration of environmental factors (Tomey & Alligood, 2002). Neuman's system model has a unique focus on assessing the patient and response to environmental stressors along with

recognition and incorporation of many other systems-based theories found in physical and social sciences (Gigliotti, 2002). Application of Neuman's theory would perceive that secondary prevention would be considered the application of fixing the nursing environment through educational interventions for quality safety (Zaccagnini & White, 2011). Tertiary prevention would focus on the prevention of illness for an individual, or in the application of the QSAAN project, prevention of future quality safety incidents by performing quality safety competencies in the practice setting. The practice issue supports a systems framework that will acknowledge individual staff members, or parts within the whole, and their impact on the organization measured through system level outcomes. This systems approach is even more necessary in consideration of the interdisciplinary environment in the acute care setting. Neuman's systems model promotes collaboration and sharing of information as a means of expanding overall knowledge (Neuman, 1995). The interactive-integrative paradigm becomes the philosophical viewpoint for this project (Newman, Sime, & Corcoran-Perry, 1991). This paradigm recognizes that responses are based on experiences and stimuli in the environment and that change will occur relative to the complex web of interrelations and societal factors (Smith & Liehr, 2008). In this manner, this paradigm will acknowledge the potentials for barriers within this practice issue.

Theoretical support for this practice issue as viewed through an inductive lens recognizes that empiric patient outcomes are impacted by various relationships and systems. Outcomes can best be impacted through a whole system approach to supporting knowledge of the workers, culture of the organization and application of quality monitoring (internal research). The middle-range theory of Nursing Intellectual Capital (Covell, 2008) addresses the topic of continuing professional development in the context of promoting high quality and safe patient care in

organizational systems, structures and outcomes. Instead of focusing on professional development of one individual nurse, Covell proposed to establish development of nursing knowledge and skill in the entire body of the nursing staff. The theory of intellectual capital evaluates the relationships and influence between the concepts of human capital; defined as the sum of knowledge, skills, and experience of the staff, structural capital, relational capital, social capital and business performance outcomes. An important focus of this theory is the application of continuing professional development and the relationship of this to improved outcomes demonstrating high quality, safe patient care. The foundation for the theory of intellectual capital originated from the business fields of economics, accounting, and business performance outcomes. This business oriented viewpoint is synergistic with the proposed practice issue which will focus on organizational outcomes.

High Reliability Theory is described by Riley (2008) as the process where "…organizational design principles and management approaches prevent patient injury and improve the patterns of poor quality" (p. 239). An organization that can demonstrate near perfection in quality and safety outcomes can be classified as a high reliability organization. Two components, interdisciplinary team training and process design were the variables examined. Riley explained reasons why errors occur in healthcare and emphasized that human error is preventable. Safety in a highly reliable organization is a shared accountability between individuals performing the care and leadership. These concepts translate to a mandate for nursing leaders to lead the focus toward the design of a high reliable practice environment. This theory supports the practice issue goal of establishing a culture where patient safety and promotion of quality is not only

disseminated throughout the organization, but an expected accountability for all levels of teams and individuals.

One of the methods to visually demonstrate theoretical foundations is in the form of a theoretical conceptual model. The conceptual model of QSAAN is pictured below in Figure 1. The model utilizes three concentric circles. In this manner, the theoretical foundation for work is patient centered care and patient outcomes as the determinant of effectiveness of care. The outer rings focus on the theoretical concepts of Nursing Intellectual Capitol, Systems Approach, and High Reliable Organizations. Each construct has influence and impacts the system as a whole.

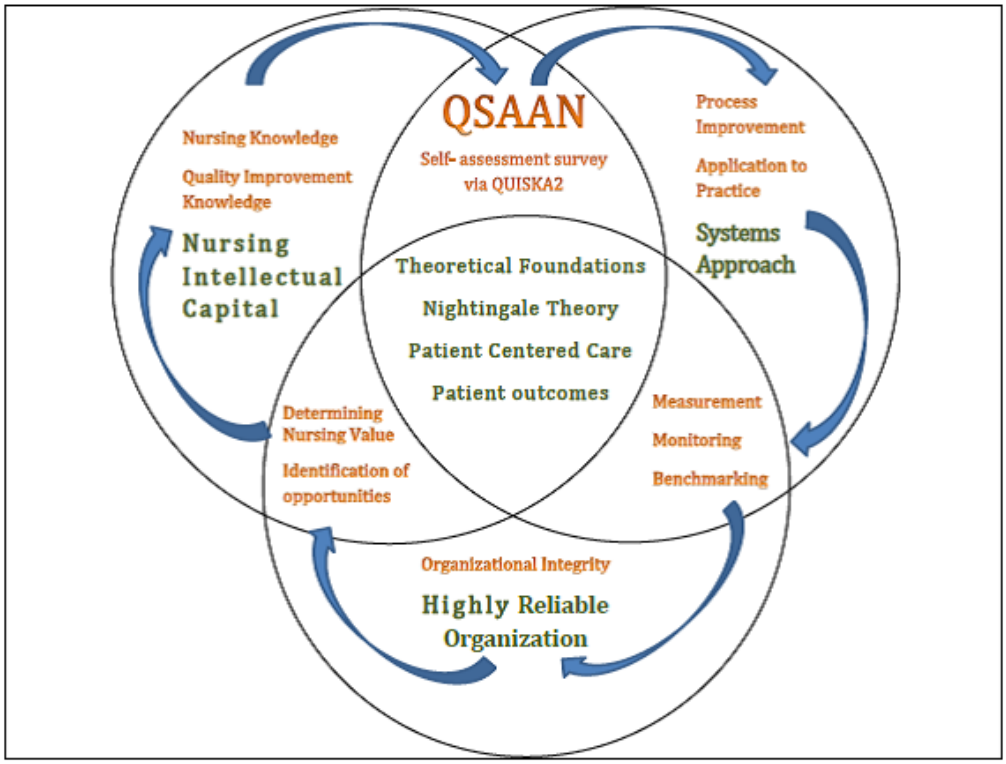

Figure1. Theoretical Conceptual Model of QSAAN, Bradley, 2011

QSAAN is supported by both grand nursing theories and subsequent middle range theories. Overlapping theoretical constructs integrate quality through knowledge integration, improvement, measurement, implementation and continual change.

Literature Selection

There were three main areas of focus chosen for the literature selection for the QSAAN capstone project. The first literature selection included searching for assessment of nursing characteristics that have demonstrated impact on quality performance in nursing practice. These articles included research that addressed the bachelor prepared registered nurses (BSN) educational level or performance of quality of care outcomes related to educational preparation or work environment (de Vries, Ramrattan, Smorenburg, Gouma, & Boermeester, 2008; IOM, 2011; Kendall-Gallagher, Aiken, Sloane, & Cimiotti, 2011; Newhouse, Provonost, Morlock, & Sproat, 2011).

The second topic of relevance included an assessment of literature related to quality and safety performance in healthcare and more specifically within the nursing profession. Examples of these articles included reports from the Institute of Medicine (1999; 2003; 2004; 2011) and other journals or healthcare publications (Classen et. al, 2011; Ginsburg, Norton, Casebeer, & Lewis, 2005; Hall, Moore, & Barnsteiner, 2008; Sullivan, 2010; Tabari-Khomeiran, & Parsa-Yekta, 2007; Upenieks, Akhavan, & Kotlerman, 2008). The other series of articles related to quality and safety in nursing were centered on the QSEN program and the implementation and dissemination of this initiative (Barton, Armstrong, Preheim, Gelmon, & Andrus, 2009; Cronenwett, et. al, 2009; Pohl et. al, 2009; Preheim, Armstrong, & Barton, 2009). The final literature selection assessed for articles specific to scientific and theoretic underpinnings of the QSAAN project. The search began with an appraisal of nursing theory and expanded to include assessment of business, economics and social theory and the application of quality improvement methodology (van Achterberg, Schoonhoven, & Grol, 2008; Warburton, 2009).

Review of Evidence

Background of the Problem

The literature is clear that educational preparation of registered nurses has an impact on the quality and safety of patient care (IOM, 2011; Kendall-Gallagher et al., 2011; Newhouse, et al., 2011). Researchers found an association between higher levels of quality and safety engagement with BSN versus associate degree registered nurses (ADN) (Newhouse et al.). Another study determined that nurses with higher academic degrees have a greater perception of teamwork within the work environment, an essential component for safe patient care (Armellino, Quinn Griffin, & Fitzpatrick, 2010). Multiple IOM reports (2003; 2011) along with The Joint Commission (TJC, 2010) and other regulatory bodies advocate for increasing the academic educational preparation of registered nurses and other healthcare professions. Nursing researchers, published in the *Joint Commission Journal on Quality & Patient Safety,* have studied recent graduates of educational programs and have determined that BSN nursing graduates have significantly higher levels of preparation on the topics related to the integration of evidence-based practice, teamwork, collaboration, and nursing research (Kovner et al., 2010). With educational preparation identified as a potential factor in quality safety knowledge, this project will also evaluate the relationship between educational preparation and knowledge, skills and attitudes related to the six QSEN domains.

In the 2003 IOM report *Health Professions Education: A Bridge to Quality,* the committee recommendations directed the development of a core set of competencies that included five categories: patient-centered care, interdisciplinary teams, evidence-based practice, quality improvement, and informatics**.** Additional recommendations promoted unified consensus

on the development of common language and the periodic demonstration of the ability to deliver care to patients as defined in core competencies. The QSEN movement was a demonstration of the nursing academic community in partnership with the Robert Woods Johnson Foundation in fulfilling the recommendations of the IOM (QSEN, 2011). The QSEN project was designed to encompass three phases. The first phase of the project began in 2005 and included the task of defining the competencies that would make up quality and safety nursing program incorporating knowledge, skills, and attitudes which would then be applied to nursing pre-licensure programs (QSEN). Phase II began in 2007, and incorporated pilot sites of QSEN curriculum integration into selected nursing education programs (Cronenwett, et al., 2009). Phase III of the QSEN program began in 2009 and is focused on the development of preparing faculty to teach the competencies, integrating competencies into textbooks, and to promote innovation in teaching the competencies (QSEN).

The IOM (1999; 2003; 2011) directed its recommendations not only to the academic setting, but also to healthcare practitioners As the curriculum of nursing education programs change to incorporate quality improvement and safety competencies, practicing nurses also need the ability to assess and demonstrate competencies related to the QSEN program. The project described in this proposal serves as an assessment of current practicing nurses against the identified competencies of the QSEN domains.

There are approximately 61,000 registered nurses in the State of Colorado (Colorado Center for Nursing Excellence, 2010a). The majority of these nurses, 60 percent, are in the acute care practice setting where they denote the largest group of healthcare professionals within acute care facilities (Bureau of Labor Statistics, 2011). The majority of nurses in the

acute care practice setting work in the role of direct care nurse, or function as the healthcare provider who provides hands-on care for patients. The direct care nurse is also the healthcare provider who spends the most time with and provides the most care or interventions for patients while they are in the acute care setting. For these reasons, nurses have the greatest impact in the provision of safe, high-quality care in the acute care setting.

Application of quality safety competencies to this population of healthcare workers has the potential to have the great impact on improving the care of millions of patients. However, standardized competencies for practicing nurses in quality and safety are not widely adopted. This is a gap in the proactive approach to improving the healthcare environment within the acute care setting. The first step in addressing this gap is an assessment of the current knowledge, skills, and attitudes of practicing nurses regarding quality safety competencies. This gap was first assessed and studied on a specific group of nurses within the acute care practice setting (Dycus and McKeon, 2009). By utilizing an evidence-based practice approach, the QSAAN DNP project identified the need to expand the assessment of current practicing nurse's knowledge, skills and attitudes regarding quality and safety topics.

Systematic Review of the Literature

One of the essential steps in the development of a DNP project is an assessment of the literature (Zaccagnini & White, 2011). The literature selection and systematic review is completed to support the problem statement and answer the questions of why the QSAAN project is needed and whether the project is timely (Zaccagnini & White). A systematic review of literature was completed during the problem recognition and definition stage of the DNP project. Articles were chosen from CINAHL, PubMed, Government websites, and Professional

organizations. Search terms included; quality, safety, practicing nurses, quality improvement, instruments, highly reliable organization, safety education, knowledge skills and attitudes, patient safety, practice environment, nursing capital, and safety culture. Additional search terms included the phrase Quality Safety Education for Nurses (QSEN) which is more of a concept versus single words; however, this combination resulted in location of several articles. The other manner of finding articles was achieved through mining the references from key articles. This resulted in locating two different instruments to measure safety knowledge, skills and attitudes, one for medical students, one for nursing students. One of the key objectives for the systematic review was for the location of a previous instrument to measure application of QSEN competencies into the practice setting, or measurement of application of QSEN competencies into the student setting (Dycus, & McKeon, 2009).

The systematic review was collated into an evidence table format as described by Houser and Oman (2011). A total of 32 articles were included in the QSAAN systematic review (Appendix A, QSAAN Systematic Review). The first category of articles describes basic concepts, or information related to the QSEN program. The next category of articles includes instruments or tools to measure competencies of quality, safety or the combination of quality safety in practice, nursing students, or other healthcare students. The third category of articles assessed other quality specific research projects or case studies. The final category of articles represent recommendations or research studies from national organizations such as the IOM and the Joint Commission and professional organizations such as the American Nurses Association (ANA). The systematic review was a starting point for evidentiary review for the support of the QSAAN project. The topic of quality safety is paramount for the healthcare industry. The growth

of the QSEN program supports the nursing profession in academic preparation of nurses in quality safety. The timeliness for this DNP project is effective to further promote the topic of quality safety in the practicing nurse setting.

Project Plan and Evaluation

Market and Risk Analysis

The market analysis portion of the QSAAN project reviews details pertinent to the healthcare industry that are applicable to the quality safety focus of the QSAAN project. This section provides an overview of the industry and future growth potential for outcomes and products within the QSAAN project. In addition, the market analysis reviews the project strengths, needs assessment, identification of stakeholders and project team and the cost-benefit analysis.

Project Strengths, Weaknesses, Opportunities and Threats

An important environmental analysis and competitive assessment tool is a SWOT analysis. The SWOT analysis is a systematic analysis focusing on internal strengths and weaknesses and external opportunities and threats (Fortenberry, 2010). The SWOT analysis is designed to capture all the items that could be strength to the program or an opportunity to the program within an environmental analysis. This design enables a quick assessment of potential positive and negative aspects within the project and within the competitive market. The SWOT method can also serve as a quick reference for rapid decision-making (Fortenberry). The QSAAN SWOT analysis includes numerous items that demonstrate the strengths and the likelihood of this project's success. See Table 1 for a graphic display of the QSAAN SWOT Analysis. The first strength identified for the QSAAN project was the ability to complete

assessment on all nurses within the acute care setting. Other strengths such as infrastructure and relationships center on the project completion within one large healthcare system. These strengths also become weaknesses or limitations as using facilities within one hospital system may limit the applicability of responses outside of the single system. External opportunities include expansion of QSEN concepts outside of the academic, yet, without initiation within the national QSEN collaborative, this also is a noted threat as this project may not gain recognition outside of the QSEN collaborative. Other noted threats that may limit the expansion of this project including the lack of funding for future research.

Table 1

QSAAN SWOT Analysis

Internal	**Strengths** 1. Analysis of all nurses within acute care setting 2. Infrastructure available to send survey via email 3. Infrastructure available to load onto intranet 4. Support of system Chief Nurse Executive 5. Familiarity between hospital leadership	**Weaknesses** 1. Limited to acute care hospitals within one city 2. Limited to acute care hospitals within one hospital system 3. Limited to non-profit hospitals 4. Limited to faith-based hospitals 5. Previous tool valid for different population
External	**Opportunities** 1. Increase knowledge of QSEN in practice setting 2. Provide feedback loop from practice to academia 3. Development of tool that can be utilized in most acute care settings	**Threats** 1. Not initiated out of current QSEN group 2. Funding for external expansion not available 3. Competing focus on single component of QSEN rather than as a whole

Driving and Restraining Forces

The QSAAN project is designed to support nurses within the acute care setting. In this manner, both the nurses and the healthcare setting benefit from this program. According to the American Hospital Association (2011) there are 5,795 registered hospitals within the United States. These hospitals include federal and non-federal, for-profit, not-for profit, rural, urban and a wide variety of community hospitals. See Appendix B, Demographics of U.S. Registered Hospitals for a detailed description. Within the State of Colorado there are 89 health care facilities listed by the Colorado Hospital Association (2011). This number represents a growth of the number of facilities as listed in the Kaiser Health Foundation report (2011) completed in 2008 on hospital ownership as seen in Appendix C, Demographics of Colorado Hospitals. According to the Kaiser Health Foundation report, nearly half of the hospitals within the state of Colorado are non-profit facilities which will be the initial target group for the QSAAN project (Kaiser Foundation).

Need, Resources and Sustainability

Healthcare jobs represent the second largest employment opportunity in the state of Colorado (Colorado Center of Nursing Excellence, 2010a). Statistics from the state report that there are 253,000 employees working in the healthcare and social service sector generating more than $11 billion in annual payroll (Colorado Center of Nursing Excellence, 2010b). According to the Colorado Center for Nursing Excellence (2010a) there are approximately 61,000 registered nurses in the State of Colorado. Application of research to this population of healthcare workers has the potential to impact a broad base of caregivers in the healthcare

arena. Appendix C, Demographics of Colorado Hospitals contains for further details regarding work site location for nurses practicing in the state of Colorado.

The QSAAN project will initially evaluate a subgroup of registered nurses employed within the largest healthcare provider in Colorado, with 14,000 employees, 5000 of them registered nurses. This healthcare provider has demonstrated growth in number of employees and number of entities within the system. Within the last four years, the number of hospitals has grown to encompass 13 hospitals, plus four additional rural affiliated hospitals (Centura Health, 2011). The ability to grow the QSAAN project will include an expanded number of nurses within the hospital system throughout the state of Colorado.

The QSAAN project is primed for significant growth potential due to the healthcare industry's current focus on quality and safety. One of the most significant growth opportunities for the QSAAN project is the demonstration of a valid and reliable instrument that can measure the translation of QSEN into the practice setting. The original QUISKA tool was first utilized in a research study specific to pediatric oncology nurses (Dycus & McKeon, 2009). The original researchers have given permission to utilize this tool and make revisions (see Appendix D, Permission to use QuISKA Tool). The revised tool will be called QUISKA2. The development of an assessment tool, QUISKA2, and standardized competencies for quality and safety will be a highly desired product for the healthcare industry.

Defining the Target Market

The customer of interest for the QSAAN project include the patient and family as the recipients of care, the practicing nurse, the health care organization, and the academic nursing community. For the purposes of this paper, the family as customer will be incorporated into the

patient identity. The patient is the secondary customer and represents the patient population that requires hospital care. This population encompasses all age groups and all ethnic races. The majority of patients in this group will be citizens of Colorado and the greater Denver metropolitan area. This patient population will expand as the project expands. The main characteristic of hospitalized patient will remain constant.

The primary customer of note with this project is the practicing nurse population. This population l includes nurses between the ages of 20 to 70 years of age and represents multiple ethnic races. This population has gainful employment with one of the acute care hospitals participating in the project. The majority of this population are citizens of the state of Colorado. The practicing nurse has a variety of roles from direct patient care to nurse executive. The academic preparation of this population encompasses various levels of academic preparation. This population characteristic may change with the expansion of the project, with the characteristic of employment at an acute care facility as a constant.

The healthcare organizations are secondary customers of this project as the overall owner of outcome performance of the nursing staff. The characteristics of the organizations include providers of acute care health care facilities. Additional characteristics include licensed bed sizes ranging from 108 beds to 402 beds. All facilities provide care for all age groups and do not discriminate in employment or care for any ethnic race. Each facility operates with a hierarchal executive team that includes a chief nursing officer who oversees the nursing functions within the facility. These organizations are unique in the fact that they share a common registered nurse (RN) job description that was designed with components of the QSEN model. The survey project

will be an opportunity to compare how the QSEN concepts apply to knowledge transfer for these nurses.

The academic community makes up the final secondary customer. The academic community is characterized by the function of having an accredited nursing program approved through the State Board of Nursing. The academic institutions that are impacted by the outcomes of the project are utilizing the QSEN educational curriculum. This curriculum requirement limits the number of academic programs available for impact on this project. Initially, this will include one State University but is expected to expand to other institutions with the advancement in the inclusion of QSEN into nursing curriculum. The single site customer is unique in that this institution was one of the original pilot sites for QSEN. While the academic community does see cyclical changes in the number of students in class during the calendar year, the feedback mechanism will be focused on the faculty or organizations themselves, precluding any impact that students may make for the academic setting.

Stakeholders and Project Team

This section of the market analysis will include the organizational structure of QSAAN including details about the different phases and potential expansions, details about the ownership of QSAAN, profiles of the management team, and the qualifications of the board of advisors.

Organizational Structure

The leadership of QSAAN can be seen in *Figure 2*, QSAAN Organizational Chart. This project is a multisite, multilevel program that requires participation from various nursing leaders both within the practice and academic setting who bring with them a variety of skill sets. The Advisory board will provide oversight, assure policy development and implementation and

monitor timelines of the project. The Project Investigator (PI) will be primary contact for funding, chair the Coordinating Council, facilitate future research, and supervise site coordination. Administrative support will include both clerical and technology support. Site Coordinators will provide sites for project implementation and oversee evaluation within the designated sites. The Coordinating Council will provide oversight of taskforces, develop policies and represent primary decision-makers. There will be three taskforces, research, competency and implementation. The research taskforce will work in conjunction with the PI and site coordinators and establish research initiatives appropriate to QSAAN. The competency taskforce will review the current QSEN competencies and design a competency tool that can be applied to practicing nurses. The implementation taskforce will develop an implementation plan for translation to multiple sites including acute care, senior care, and homecare along with multistate application.

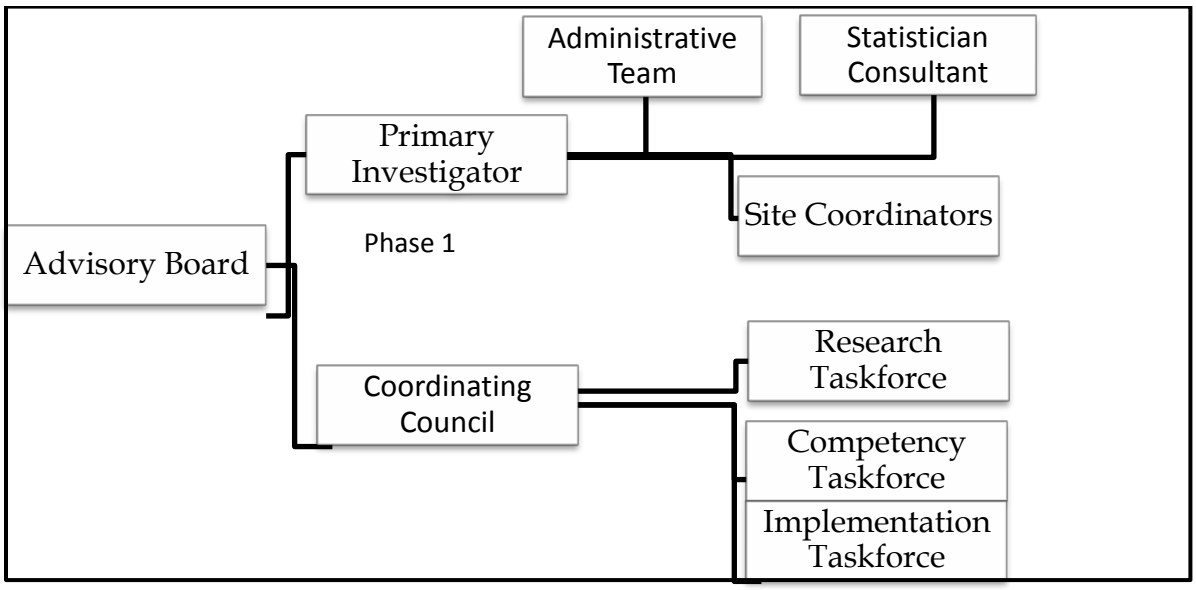

Figure 2. QSAAN Organizational Chart

The QSAAN project is organized to be an expandable program. In Phase I, the organization

is accountable for the initial self-assessment survey study. This phase includes a primary investigator (PI) as the leader, an administrative assistant, and a consultative statistician. The PI completes the self-assessment survey study and is primary contact for funding, chairs the Coordinating Council, facilitates future research, and supervises site coordination. Administrative support includes both clerical and technology support. The statistician is used on an as needed basis providing initial statistical consultation and statistical support for data analysis upon completion of the survey. The employment status for this position is as a consultant.

The Phase I QSAAN project has an advisory panel for support. The advisory panel is directly connected to the primary investigator as advisors/mentors to the survey study process and subsequent research design and evaluation. Leaders within Phase I continue to provide vision for growth of the QSAAN project. Ownership of the QSAAN project during phase I is the exclusive property of the primary investigator.

Advisory panel phase I. The members of phase I Advisory panel include the Capstone Chair, advisor and mentor for the DNP student who is the primary investigator. The leadership qualifications include doctorally prepared nurses who share in-depth knowledge of the QSAAN project. In addition, all three of these nursing leaders have participated and completed independent research studies. These nursing leaders also represent various settings within nursing practice to include academia and practice. The function of the Advisory Panel for Phase I includes mentoring and assessment of completion of the self-assessment survey study. Additional functions include recommendations to the primary investigator for additional focus

and structure to the research process. Additional information for Advisory Panel for Phase II is located in Appendix E, Advisory Panel for Phase II.

Organizational Analysis

The environmental analysis and competitive assessment of the QSAAN project includes evaluation of current programs in the academic setting and impact of the current regulatory climate in the U.S. healthcare system. The mandate to improve the provision of quality and safety is well known and can be demonstrated in the transparency of quality outcomes visible on state hospital association websites. The competency demonstration of all levels of nurses from students to practicing nurses will be a demonstration of the professions desire to improve the knowledge skills and attitudes of the largest providers of healthcare in the United States.

Cost Benefit Analysis

The regulatory climate has mandated that healthcare organizations find ways to improve quality and safety in patient care. The consequences of not meeting these standards are a reduction of reimbursement to facilities that participate in government funded programs (The Centers for Medicare and Medicaid Services, 2007). Another consequence of lower quality safety outcomes is the loss of consumer confidence. This is an important consideration as public reporting of outcomes increase. Currently, within the state of Colorado there is a mandate that hospitals have transparency of reporting of quality of care to be displayed on a publically reported hospital level dashboard (Colorado Hospital Association, 2011). The provision of transparency of reporting and documentation has prompted healthcare facilities to explore means of improving quality and safety outcomes.

The QSAAN project promotes a proactive approach to assessing and measuring nursing competency in quality and safety. This tool development will be a benefit to the organizations that are participating in the research project by providing a quality safety assessment of practicing nurses. This assessment can then be used to establish quality safety competencies specific to the role in which the nurse practices. Additionally, utilization of a tool to measure the knowledge of the nursing workforce is an efficient and effective first step in establishing a baseline plan for improvement of the quality safety environment. Identifying the gaps in knowledge, skills, and attitudes allows for the development of focused educational interventions on topics within the QSEN domains will promote improved quality performance. This performance is an important consideration for healthcare facilities.

Another noted trend within the state of Colorado, particularly in the Denver Metropolitan area, is that the majority of acute care healthcare facilities are in pursuit of Magnet® recognition. This trend will positively impact the willingness of organizations to seek out and participate in nursing research. One of the expectations required for the Magnet® application process is active participation in nursing research (American Nurses Credentialing Center, 2011). The ability to join in a collaborative research project sponsored by another facility is a cost benefit to these facilities. In the QSAAN project, the collaborative hospitals gain the benefit of active nursing research and carry only the actual time for survey completion for their staff, a minimal cost. These hospitals save the cost of having a formal nurse researcher on staff and the additional costs associated with research including data analysis, software support and administrative costs.

The budget, resources and funding for the QSAAN program are listed on Appendix F, QSAAN Budget and Resources. Identified resources include two specific in-kind donations from the Primary Investigator's site of work and the participating acute care facilities. The first in-kind donation was use of Survey Monkey™ which was the electronic survey assessment modality. The second in-kind donation was the cost of participant time to complete the QUISKA2 survey. Each of the participating facilities agreed to provide the opportunity for participants to complete the survey during work hours. Estimated cost for participant completion of the QSAAN survey was calculated based on a 28.2 minutes average for completion time. This estimate was based on the first survey study completed by Dycus and McKeon (2009). Salary costs were estimated based on the inclusion of three levels of nursing roles with participation of direct care nurses through nurse executives. The total in-kind cost was approximately $8,450.

Liabilities included the cost of SPSS software rental for the primary investigator, consultation expenses for a statistician and an administrative assistant, printing of final reports for the various practice sites, incentive rewards for each of the facilities, and dissemination of the project at one or more conferences. Dissemination costs included cost of registration, travel, hotels, and a professionally produced poster. Total costs are estimated at $10,955. The net costs for the primary investigator after accounting for In-Kind donations from the facilities are approximately $2,650. Grant funding options were investigated to cover cost of statistical review and other expenses. Initial funding award requests were submitted to the local chapter of Sigma Theta Tau International. As the project expands, additional funding sources will be investigated (See Table F.2).

The QSAAN project is well suited to see rapid growth to support hospitals that are seeking the products of quality safety assessment and standardize quality safety competencies. The cost benefit for the organizations is significant in the ability to demonstrate quality safety competencies, and more importantly, to avoid adverse events that result in patient harm.

Project Objectives

Mission and Vision. Another foundational step for the development of the QSAAN project is the establishment of vision and mission statements. The development of mission and vision statements is important as this is what sets the tone, values, and scope of the program or project (Covey, 2011). Leaders that promote and communicate values establish a foundation that cultivates excellence (Fortenberry, 2010). Thus, one of the initial actions of forming a business or organization is the development of a vision and the formation of a mission statement.

Vision and mission statements reflect the values, commitments, service, and outcomes of the organization (Fortenberry, 2010). These statements both inspire and ground the individuals who are impacted by the program or service of the organization. The statements also reflect the strategic planning and leadership beliefs. An important consideration for these statements is the need for careful development of words or concepts that make up the statement. The leader's beliefs will be included as they promote the strategic planning and future state for the organization. Recognition of future participants and outcomes must be considered to promote a welcoming inclusive environment as appropriate for the organization.

The current vision statement for the QSAAN project is "to be nursing professionals passionate about quality, safety and nursing excellence". This vision statement reflects the vision of nursing professionalism as a designed state of performance. A value statement of

passion for the profession helps to define a higher state of emotion or attachment to the profession. Passion evokes an emotional response and can be reflected in the synonyms of hunger, desire, or appetite (Encarta Dictionary, 2011). This strong desire to improve quality and safety in nursing is the emphasis for this vision statement. The focus on nursing excellence is the desired state of performance. Nursing excellence can be defined in many different manners, through demonstration of competencies on an individual level, outcome performance standards on a unit or facility level, or through achievement of recognition at the organizational level.

The current mission statement for the QSAAN project is to promote the provision of professional nursing leadership supporting excellence in patient care, facilitating interdisciplinary teamwork and collaboration, and demonstrating servant leadership to caregivers, patients, families and self. The mission statement reflects the professional practice of a nurse, specifically in the manner in which the mission will be enacted. Specific attention to the mission statement for the QSAAN organization includes the words interdisciplinary teamwork and collaboration. Nursing is not performed independently in the acute care setting. Rather, it is a team environment that functions at the highest level when collaboration between team members promotes the goal for quality safety care. Another distinction in the mission statement is a specific reference to patients, family, and self. This differs from traditional organizational reference to the community. The choice for more specific clarifications derives from the concept of nursing care occurring on a more personal level reflecting care of individuals, and families. This reflection of the individual ties in concepts of nurses' specific role as a profession, to be patient advocates. In addition, the concept of patient, family and self reflects a philosophy based on the concepts found within Relationship-Based Care by Koloroutis et al., (2004). Relationship-based care is the foundational

philosophy of nursing care adopted by the leader of the QSAAN project and in the participating facilities within the initial research survey study.

Goals and Objectives

The QSAAN projects' primary goal is to facilitate the promotion and provision of improvement of quality safety practice for nurses in the acute care practice setting. The objectives of the QSAAN program are to: 1) obtain a baseline self-assessment of the practicing nurse population's ability to demonstrate the knowledge, skills and attitudes related to the QSEN competencies; 2) facilitate the translation of knowledge about the QSEN competencies into the practicing nurse setting; 3) provide a mechanism for feedback between nursing academia and nursing practice related to QSEN competencies; 4) develop of the QUISKA2 tool that can be used in the majority of practice settings for assessment of QSEN competencies; and 5) improve the quality safety environment for practicing nurses.

In order to meet the primary goals and objectives of the QSAAN project it was essential to understand basic quality safety functions within an acute care facility. Understanding the integration of quality safety in the healthcare environment included participation in the various activities that support quality improvement, such as educational interventions, participation in strategic planning, formation of job descriptions, and analysis of quality outcomes. Principles of quality improvement utilizing Donabedian's (1980) quality framework of structure, process, and outcomes were incorporated in the formation of the goals. The following list outlines the various goals, objective and assessment that supported clinical practice activities to support the development and formation of goals in the QSAAN project.

Table 2, *Goals of QSAAN Preparation*

• Design nursing leadership job description that reflects responsibility to nursing performance, practice and innovation by September 2011. (Structure)
• Design nursing quality strategic plan incorporating facility level strategic plans, department specific quality plans, regulatory standards, and nursing division outcomes by May 2011. (Structure)
• Analyze information technology as a tool to promote quality outcomes by May 2011. (Process)
• Design a template to facilitate application of National Database for Nursing Quality Indicators (NDNQI) data integration into unit specific strategic plans by June 2011. (Process)
• Collaborate with quality and nursing business systems to identify quality reporting and benchmarking capabilities for an acute care hospital by June 2011. (Process)
• Utilize quality data including NDNQI/ Core Measures, to identify below median outcomes of vulnerable populations by May 2011. (Outcome)
• Develop an educational workshop for direct care givers with a focus on shared governance (accountability) and quality by February 2011. (Structure)
• Educate direct care givers in the development of unit specific strategic plans by February 2011. (Process)
• Educate direct care givers in the role of a professional in accountability of quality and safety outcomes by February 2011. (Process)
• Design nursing process improvement job description incorporating role of quality/safety outcomes champion by July 2011. (Structure)
• Establish partnerships with other acute care facilities to promote quality/ accountability education by September 2011. (Process)
• Collaborate with other healthcare facilities to identify below median outcomes of vulnerable populations by September 2011. (Process)
• Submit abstracts for conference presentations of shared governance influence on quality safety outcomes by June 2011. (Outcome)
• Assist in the draft of a grant application to promote educational interventions directed at shared governance and quality safety outcomes by May 2011. (Process)
• Evaluate the effectiveness of unit level shared governance on unit level outcomes by May 2011. (Outcome)
• Evaluate the effectiveness of unit level EBP projects on unit level outcomes by November 2011. (Outcome)

Understanding quality improvement from a systems perspective within an acute care facility was necessary to the design, integration, and promotion of QSAAN. The various activities highlighted the collaborative team involvement in quality safety within a healthcare facility. During the course of the project design, it became evident that not all original goals and objectives fit into the QSAAN project. The project was altered to include only the self-assessment survey study to allow for purposeful study of the knowledge, skills, and attitudes of practicing nurses. Intentional quality improvement education was moved to be designed after completion of the DNP project. Additional changes included exchanging the design of a job description from a quality improvement specialist to the development of unit based clinical nursing educator job description. This change was the result of completion of a needs assessment, analysis of performance indicators, and collaborative decision-making with the quality department. Further details outlining specific activities, time commitments and achievement of goals is included in Appendix G, Goal Completion.

Evaluation Plan

Conceptual Model

Essential to the plan for evaluation is the design and development of models to outline programs, progress, interaction, and the outcomes of the project (Zaccagnini & White, 2011). This process is noted in Step VI, Planning for Evaluation, one of the steps included in the DNP Process Model (Zaccagnini & White). Models can take different forms from visual models, such as the conceptual model, that demonstrate interaction and associations, to template models such as a Logic Model.

The conceptual model for QSAAN visually demonstrates the projects components and action steps including the measurement tool, the different groups of participants and the relationships between the different QSEN components (See Appendix H, QSAAN Conceptual Model for the visual presentation of the QSAAN Conceptual Model). The intent of this model is not to demonstrate proof of causation, one of the biggest challenges in any interventional research project; rather, this model will demonstrate careful clinical analysis of the project, the components and the action steps of this project (Kane & Radosevich, 2011). One of the importance concepts illustrated is the relationship between academia and practice and the feedback mechanisms between these two sectors of nursing practice. Incorporated in this relationship is a translation of new knowledge from academia to practice. Zaccagnini and White (2011) refer to the role of the DNP as a leader in implementing translation of research into practice, or the dissemination of evidence-based practice. The evaluation of practicing nursing knowledge, skills, and attitudes will serve as a primary step for the translation of QSEN competencies into the practicing setting.

The design of this model was influenced by Earp and Ennett (1991) who recommend that conceptual models show a clear end point of interest and visually interesting depictions with arrows and textboxes. It was more important to illustrate a distinction between the QSEN components and domains rather than illustrating the degree of the relationships. Thus, within the larger textboxes, the model presents both the knowledge, skills, and attitudes components and the subsequent QSEN domains. The conceptual model is a visual diagram of the steps and associations between the variables of this project.

Logic Model

In a similar fashion, the Logic Model in Appendix I, Logic Model, is an in-depth description of the resources/ inputs, activities, outputs, outcomes and impact of different components and aspects of this project. The Logic Model provides the details to explain the actions listed within the conceptual model. An illustration of this point can be evaluated by examining one component of the conceptual model. The action step represented by the bifurcated green arrows on the conceptual model is explained as distribution of the tool via Survey Monkey ™ and use of site champions on the Logic Model. Additional comments such as fiscal allocation and potential impact to the study validity are included in the Logic Model. The use of both tools enhances clarification and visualization to the details of this project.

DNP Capstone Timeline

Another tool utilized to track application of the DNP Capstone project was a timeline specifically designed to reflect the various steps within the DNP Process Model (Appendix J, QSAAN Timeline). Each of the steps within the DNP Process Model is listed on the timeline. Under each step are the specific action steps that were completed in the course of the QSAAN project. The timeline also incorporates recognition of each semester of coursework and acknowledgment of completeness from planned, in-process to complete. Each action step also incorporates Donabedian's framework through the identification of each tactic as structure, process or outcomes (Donabedian, 1980). This reference to Donabedian's framework correlates to the application of structure, process, and outcomes to the clinical practicum goals to support experiential learning activities to promote the QSAAN program. Figure 3. QSAAN Project Plan April 2012 displays the progress of each step within the DNP Process Model. The QSAAN

project has met the expected timeline expectation with current activities in Step VII Implementation, Step IX Utilizing and Reporting Results and Step X Future Scholarship.

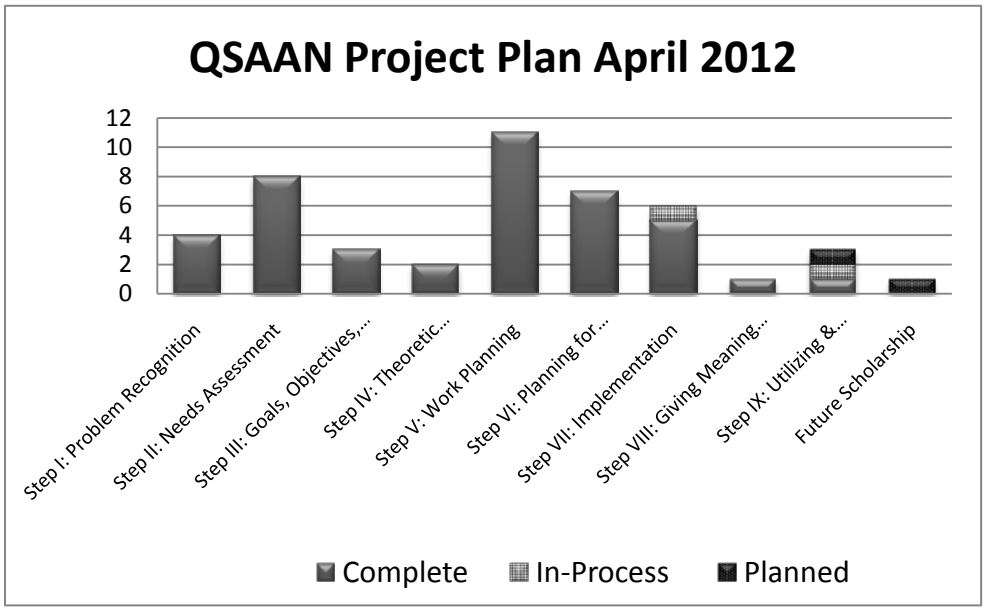

Figure 3. QSAAN Project Plan April 2012

Methodology

Sampling Parameters and Setting

In January of 2012, all levels of practicing nurses from four acute care hospitals within the Denver Metropolitan area were asked to participate in a descriptive survey study utilizing the Quality Improvement Knowledge, Skills, and Attitudes (QUISKA2) tool (Appendix K, QUISKA2). Each of the facilities selected for participation is a member of a larger statewide not-for-profit; faith-based healthcare organization. The sample population included only registered nurses who were employed at the designated facilities during the survey period. Registered nurses employed at any of the designated facilities but on extended leave of absence during the time of the survey were excluded. Other nurses working at the facilities, such as travelers (contracted temporary assignment registered nurses) or regional float pool nurses, and those

classified as non-facility employees were also excluded from the survey. The sample size participant pool included 2060 registered nurses who worked at one of the four facilities. Registered nurses were requested to complete the survey one time during the designated three week survey period.

Protection of Human Rights Procedure

Institutional Review Board (IRB) approval was attained from Regis University, the primary approval site and two additional IRBs which represented the four designated facilities. (Appendix L, IRB Approvals). In preparation for IRB submission, additional training on the protection of human subjects was completed including; Collaborative Institutional Training Initiative training (CITI) and National Institute of Health (NIH) training were completed (See Appendix M, CITI Training Certificate, Appendix N, NIH Training Certificate). Chief Nursing Officers within each of the four designated facilities provided letters of agreement and support to participate in the QSAAN survey study, a component utilized during the IRB approval process (Appendix O, Facility Letters of Support). The participant population of registered nurse had free choice to participate in the survey or to drop out at any time during the survey. Participation in the survey was not a condition of continued employment or a factor in performance appraisals or compensation. Consent for the survey was obtained as the first question in the survey instrument and understood when the registered nurse chose to complete the survey.

Instrument Reliability and Validity

The QUISKA2 tool was evaluated for content validity by acute care nurses, the original researchers and designers of the initial QuISKA tool, a content expert and QSEN researcher, nurse leaders, and a nursing test-construction expert prior to distribution. Final questions were

loaded into Survey Monkey™ format and tested for ease of completion and for confirmation of functioning links. A convenience sample group (n = 10) completed the Survey Monkey™ assessment for the purpose of testing the reliability of the survey with attention to time and ease of completion. The QUISKA2 tool was administered via Survey Monkey™ and sent via email to all eligible nurses from the four facilities. Nurses had access to the survey from work computers and home computers. The survey was available for a three week time period.

A presentation and invitation to participate was given six to eight weeks prior to the survey at each hospital's nursing leadership councils, evidence-based practice and research councils, and nursing practice councils meetings. Site champions were recruited to assist with clarification of names of registered nurses and to encourage nursing staff from each facility to participate in the survey. Invitations to participate were emailed to registered nurses upon the start of the survey. Up to three reminder emails were sent to participants who had not completed the survey after weeks one and two and then three days prior to the close of the survey. Survey completion rates were sent to the Chief Nursing Officer (CNO), Directors of Professional Resources, and/or site champions at the end of week one and week two and then daily for week three.

Study Variables

The QSAAN descriptive survey study was intended to measure the participants' ability to demonstrate self-assessment of knowledge, skills, and attitude related to various QSEN domains. The dependent, or criterion, variables were selected as a reflection of the QSEN model to assess the subset scores of knowledge, skills, and attitude. Additional dependent variables included the QSEN domain scores for Patient Centered Care, Teamwork and Collaboration, Evidence Based Practice, Quality Improvement, Safety, and Informatics. The independent, or predictor, variables

were selected based on the desire to capture outcomes related to differences in participant characteristics. The independent variables included facility, unit of work, national certification, level of nursing education, nursing role, years from nursing education, and previous quality improvement knowledge. Additional characteristics of age and gender were included as covariates as these could influence findings.

The demographic data that were collected was generic in nature and commonly reported in most research studies. The remainder of the study outcomes reflects a condition-specific format. This is not disease or illness related as would be the case for condition-specific outcomes; however, this does represent a specific population of study, practicing nurses in acute care settings. For this reason, outcomes will be considered as condition-specific.

Primary Outcomes and Driving Questions

The QSAAN project has five overarching outcomes. Within each of these outcomes are research questions that will be answered through the descriptive survey study. The first primary outcome of the QSAAN project was to assess the reliability and validity of the QUISKA2 tool as a measurement of acute care practicing nurses' self-assessment of knowledge, skills, and attitudes related to the QSEN domains. The driving question to that outcome was: is the QUISKA2 a valid and reliable tool for use within the acute care practicing nurse setting? A second question for the first outcome was: is this tool valid and reliable for all levels of nurses within the acute care practice setting?

The second outcome was to understand how each of the independent variables contributes to scores within the subsets of knowledge, skills, and attitudes throughout the QSEN domains. The research question of interest was: for practicing nurses in the acute care setting,

which of the QSEN domains has the highest and lowest familiarity, attitude, and proficiency/frequency of skill level for participants?

The third primary outcome was to assess differences among the three levels of nursing roles for the acute care practicing nurses' knowledge, skills, and attitudes within the QSEN domains. The question driving this outcome was: does the nursing role influence the scores for knowledge, skills, and attitudes? An additional question for this outcome was: at what point in the leadership continuum do practicing nurses start to utilize and/or understand some of the higher level skills as addressed in QSEN domains?

The fourth outcome was to assess differences among levels of education of acute care practicing nurses' knowledge, skills, and attitudes within the QSEN domains. The question this outcome addresses was: is there a difference between levels of education and the knowledge, skills, and attitudes of current practicing nurses? A second question related to level of education was: is there a difference in level of education and knowledge, skills, and attitudes related to the three levels of nursing roles?

The final outcome was to assess differences between unit of work knowledge, skills, and attitudes within the QSEN domains. The question that drives this outcome was: does the unit of work have an impact upon the acute care practicing nurses' scores for knowledge, skills, and attitudes related to the QSEN domains?

Survey Instrument

The QUISKA2 tool is a 73 question survey based on the QSEN competencies which were originally designed as curriculum content for nursing students. Each of the questions fit within the subsets of knowledge, skills, or attitude and one of the six QSEN domains: Patient-Centered

Care, Teamwork and Collaboration, Evidence-Based Practice, Quality Improvement, Safety, and Informatics. The question format is intended to be an assessment of knowledge or self -report of skills and attitude related to the QSEN domains. Table 3, QUISKA2 Specification Table highlights the percentage of questions and number of questions within the subsets of knowledge, skills, attitude and the corresponding QSEN domain.

The QUISKA2 tool includes 17 items that measure knowledge, 45 that measure skill, and 11 that measure attitude. The knowledge questions included 11 multiple-choice and six true/false questions. Fifteen of the skills questions are multiple choice questions. The remaining 30 skills questions utilize a self-reported 6-item, Likert-type scale with responses of novice to expert and frequency of demonstration. These questions represent interval level data due to the number of times the subject has completed the skill. The questions that measure attitude utilize a four item Likert scale with responses that range from not important at all to high importance and represent ordinal level data (Dycus & McKeon, 2009). The multiple choice and true/false questions represent ordinal data of yes/no, correct or not correct.

Table 3,

QUISKA2 Specification Table

The QUISKA2 Tool Specification Table								
	% (n)							
QSEN Domains	**Knowledge**		**Skills**		**Attitude**		**Total**	
Quality Improvement	8.2	(6)	17.8	(13)	2.7	(2)	28.8	(21)
Safety	2.7	(2)	5.5	(4)	1.4	(1)	9.6	(7)
Evidence-Based Practice	4.1	(3)	17.8	(13)	2.7	(2)	24.7	(18)
Teamwork & Collaboration	1.4	(1)	8.2	(6)	2.7	(2)	12.3	(9)
Informatics	4.1	(3)	5.5	(4)	1.4	(1)	11.0	(8)
Patient Centered Care	2.7	(2)	6.8	(5)	4.1	(3)	13.7	(10)
Total	23.3	(17)	61.6	(45)	15.1	(11)	100.0	(73)
n = number of questions								

The QUISKA2 tool is a modification of the original instrument Quality Improvement Knowledge, Skills, and Attitudes (QuISKA) tool developed by Dycus and McKeon (2009). Modifications to the tool were necessary in order to be applicable to acute care practicing nurses beyond the pediatric nurse specialty. Every attempt was made to maintain the content exactly as written in the QuISKA instrument. Seven questions were altered to improve readability or application to a broader audience. For example, in three questions the words child or mother were replace with the word patient. For another question outcome numbers and years displayed on a chart were updated to reflect a more recent time frame. Individual question specification into the KSA subsets and the QSEN domains was not available when assessing the original tool prior to distribution of this survey study. The decision of how to categorize questions and the placement of questions into the subsets of knowledge, skills, and attitudes within the various QSEN domains was made after consultation with the QUISKA2 review panel. It was noted several questions could fit more than one domain. The final determination of domain was based on current applicability to practice and inclusion in current QSEN curriculum guidelines. For this reason, the overall number of items in each subset and each domain is different in the QUISKA2 instrument than from the original QuISKA tool. However, overall design including the number of questions and methodology of question type remained unchanged from the original tool.

Demographic components of the QUISKA2 instrument. The QSAAN descriptive survey study collected nine data points for basic demographics including age, gender, unit of work, facility, national certification, level of nursing education, nursing role, previous quality improvement education, and years from graduation of nursing program. Individual item analysis

was intended to include the number of participants and utilize frequency measures of mean, standard deviation and range. The revised instrument QUISKA2 tool had three additional questions not on the original tool used by Dycus and McKeon (2009). The additional questions included unit of work, nursing role, and national certification. Unit of work was divided into nine categories to encompass typical practice sites within the acute care setting including: Medical/Surgical; Intensive Care Units/Step-Down Units (ICU/SDU); Perioperative areas (Periop); Emergency Care; Obstetrics/Gynecology/Neonate Intensive Care Unit (OB/GYN/NICU); Pediatric/ Rehabilitation/ Psychiatric; Ambulatory - GI Lab, Radiology, Cardiac Catheterization Procedural area (Cath Lab), Wound Care; Support departments- Quality Improvement/Safety/Infection Control (QI), Education (EDU), Informatics, Case Management (CM); and Leadership. Specialty areas such as pediatrics, acute inpatient rehabilitation, and psychiatric units were grouped together to represent unique practice settings and to support a more robust statistical analysis. Three levels of nursing roles within the acute care setting were chosen, direct care, front line leaders and nurses executive. Direct care nurses included registered nurses providing hands on care to patients/clients. Front line leaders included assistant nurse managers, managers, educators, and case managers. Nurse executives included nursing directors, chief nursing officers, and advanced practice registered nurses (APRN) including both clinical nurse specialist and nurse practitioners. APRNs were included with the nurse executive group due to educational preparation and practice roles. National certification included certification from a professional organization such as Association of Operating Room Nurses or the American Nurses Credentialing Center.

Data Collection

Data collection occurred via Survey Monkey™ questionnaire. Data were exported to an Excel worksheet from Survey Monkey™ and transferred into Statistical Package for the Social Sciences (SPSS). A database dictionary was utilized during configuration of the data analysis plan and analysis phases of this project. The database dictionary was divided into four separate Excel worksheets including demographics, knowledge, skills, and attitudes. Each spreadsheet was designed to identify the name of the data point, the description or definition of the data point, the future frequency/standard deviation, the position on the survey tool and subsequent data analysis plan. Value labels specify a one (1) for the correct response and a zero (0) for incorrect responses for the true/false and multiple choice questions. Other measurement techniques such as Likert scales were further specified in the initial sections as applicable. The percentage of correct answers was utilized as a frequency score upon data analysis. Participant's access was limited to the Survey Monkey™ tool and did not include access to the value labels or data dictionary.

The Survey Monkey™ questionnaire was configured to require an answer to each data point prior to progression to the next answer or screen. This eliminated the possibility of missing items. It was acknowledged this design could decrease the total number of completed surveys as participants may not have felt comfortable answering every question. The forced answer design was still selected as the preferred build to prevent missing item issues and was the default setting. All participants had the option to exit the survey at any point during the survey. Participants also had the option to come back to the survey at a later date to finish. The design was established through the unique identifier in each of the participant email invitations.

Calculation of Sample Size

The determination of sample size was calculated to accommodate a power of .80 and alpha of 0.5. Sample size was evaluated based on the ability to complete different statistical tests. One of the primary outcomes was to assess applicability of this tool to three levels of nursing leaders. An apriori power analysis calculated the sample of size of 322 based on a power of .80 and alpha of .5 (Polit, 2010). Another targeted statistical test included the ability to perform factor analysis on the tool. Sample size calculation was based on similar determinations used by Chenot and Daniel (2010) that assessed the QSEN domain of safety in the student nurse population. Chenot and Daniel used a calculation of adequate sample size of at least five respondents per item for factor analysis based on Tabachnike and Fidell (2001). Due to the length of the QUISKA2 tool, 73 questions, the expectations for completion were set at achieving a sample size of at least 365 respondents.

Data Analysis Plan

Descriptive statistics were used for demographic data analysis. Other statistical analyses included the creation of subscores within knowledge, skills critical thinking, skills proficiency/ frequency, and attitude subsets utilizing interval data. Means comparison analysis was completed between the different domains of QSEN. MANOVA was used to compare groups within and between various independent and dependent variables. Correlation analysis for scale utilized Pearson's ***r*** for interval data and Spearman Rho for ordinal data. Factor Analysis was completed on the 73 questions in the QUISKA2 instrument evaluating both overall and nursing role applicability. Finally, Cronbach's alpha was applied to assess reliability of the tool. SPSS version 20 was used during statistical analysis.

Project Findings and Results

Six hundred and sixty-eight of the 2060 invited nurses submitted surveys during the three week survey period for a participation rate of 32.4%. Only surveys with every question totally completed were used, resulting in elimination of 302 (45.2%) partially complete surveys. Fifty-five percent of participants who started the survey completed the entire survey. Individual facility participation rates of participation ranged from 26.0% to 37.1%. Distribution of facility participation is noted in Table 4: Facility Participation Rates. The average time for a participant to complete the survey was 25.93 ± 11.48 minutes.

Table 4

Facility participation rate

Facility Participation Rates										
	A (n = 514)		**B (n = 539)**		**C (n = 369)**		**D (n = 652)**		**Overall (N = 2060)**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Participation Rate	96	(26.0)	200	(37.1)	151	(29.4)	204	(31.3)	668	(32.4)
Completed Survey Rate	56	(58.3)	115	(57.5)	79	(52.3)	116	(56.9)	366	(54.8)
Percent of Survey Total	15.30%		31.40%		21.60%		31.70%		100.00%	

Participant demographics included the indicators of gender, age, unit of work, hospital, nursing role, level of education, certification, years from nursing school, and previous quality improvement education (Appendix P, Participant Demographic Data). The typical respondent was a female nurse greater than 50 years old with a BSN degree earned greater than 20 years ago. The typical respondent works as a direct care nurse in either medical/surgical, intensive care or step-down units, or in the perioperative area. Ninety-one percent of participants were female

practicing in one of nine different units of work/or areas of specialty. One-quarter (25.4%) worked in the medical/surgical area with another 18% in the intensive care areas of adult ICU or step down units. Each of the other unit of work participant percentages is shown in Figure 4, Participant Unit of Work.

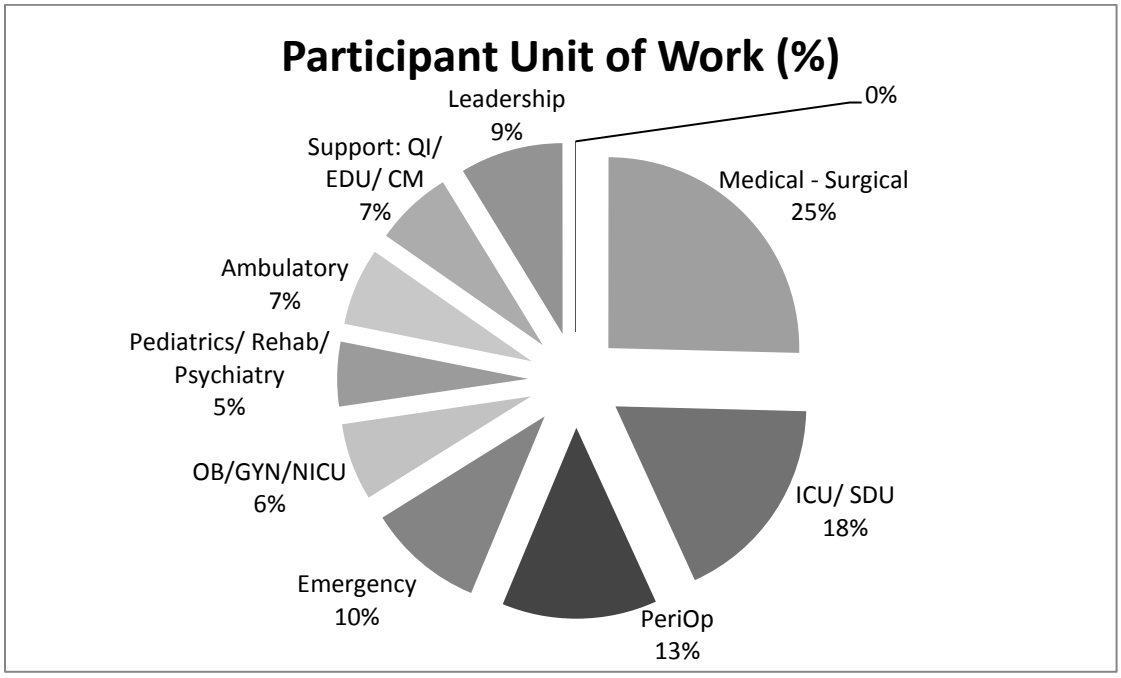

Figure 4, Participant Unit of Work

Nearly 57% of the respondents were between 40 and 59 years old, with 11.2 % reporting their age as in the 20s. As seen in Figure 5, Level of Education, more than half (54.9%) of the participants reported a BSN degree as the highest level of education with 21.3% with Associate degree and 13.4% with a Master of Science or Master of Science in Nursing degree (MS/MSN) to be the highest level of education.

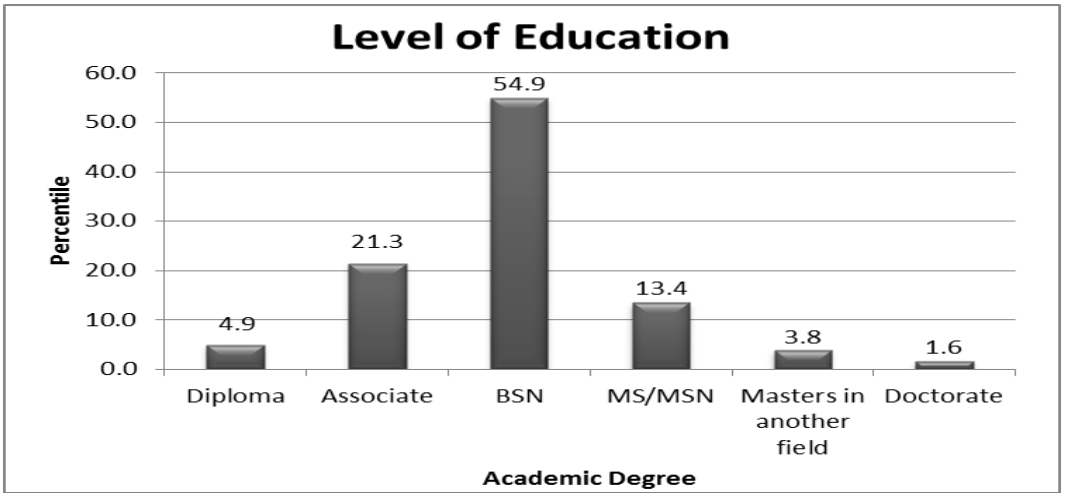

Figure 5, Level of Education

Approximately half of the participants were certified (50%) and self-reported previous quality improvement training (51.2%). Less than 5% of participants graduated from nursing school within the last two years, while the largest percentage, 45.6% reported greater than 20 years from nursing school (Figure 6, Years of Graduation from Nursing School). The participants were categorized into the three nursing roles; 64.2% direct care nurses, 28.1% front line leaders and 7.7% nurse executives.

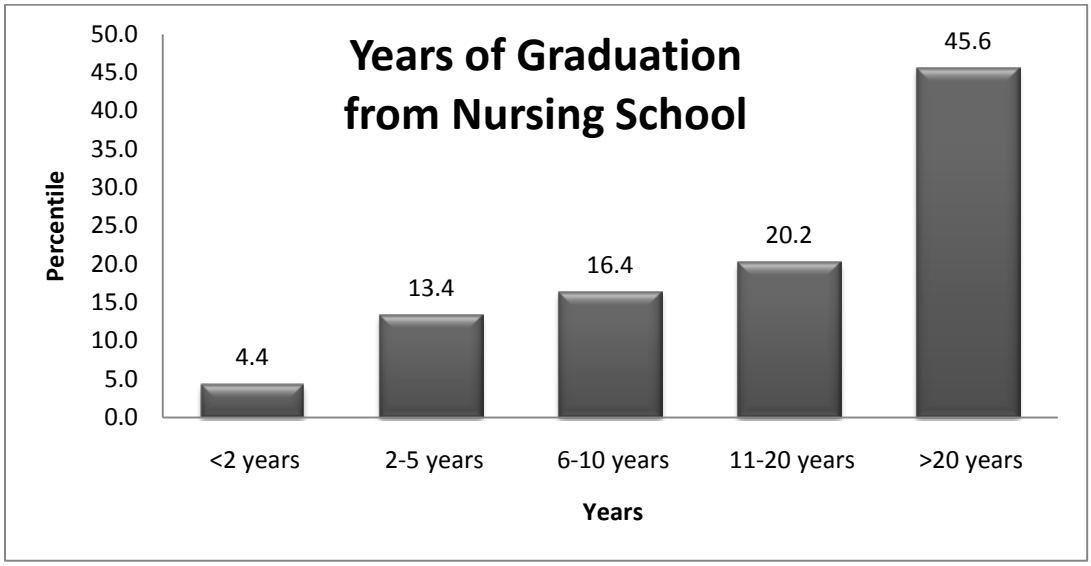

Figure 6, Years of Graduation from Nursing School

Results

Internal Consistency Reliability Analysis of the QUISKA2 Tool

Overall Internal Consistency Reliability Analysis of the QUISKA2 Tool. The first primary outcome of the QSAAN project was to assess the reliability and validity of the QUISKA2 tool as a measurement of practicing nurses' self-assessment of knowledge, skills, and attitudes related to the QSEN domains. The following sections address the methods used to assess the reliability and validity of this instrument. Cronbach's alpha was calculated to evaluate variability in individual items and composite scale scores. The inter-item correlation coefficients of the overall 73 questions of the QUISKA2 was $r = .940$, ($p = <.001$). Evaluation was completed as an overall assessment of the tool and as an assessment for the three levels of nursing roles (direct care nurses, front line leaders, and nurse executives). The inter-item correlation coefficients of the QUISKA2 was direct care nurses $r = .927$ ($p = <.001$); for front line leaders $r = .941$ ($p = <.001$); and for nurse executive $r = .939$ ($p = <.001$). The QSAAN correlations demonstrate applicability of this instrument to the three levels of practicing nurses.

Internal consistency reliability analysis of the Knowledge, Skills, and Attitude subsets. Additional internal consistency analysis was completed on separate subsections within the QUISKA2 tool including knowledge, skills, and attitude subset. (See Appendix Q, Internal Consistency Tables).

Knowledge question analysis. The inter-item correlation coefficients of the QUISKA2 for knowledge questions which included 32 multiple choice and true/false questions was $r = .61$ ($p = <.001$). This knowledge evaluation included the 17 knowledge subset questions and the 15 skills critical thinking questions. This combination of knowledge and multiple choice skills

questions mirrors the original study using the QuISKA tool which evaluated the inter-item correlation with both the 17 knowledge and 15 multiple choice skills questions together. The combined knowledge subset was analyzed for applicability to the three nursing roles. The inter-item correlation coefficients of the 32 knowledge questions was direct care nurses r = .577 (p = <.001); for front line leaders r = .618 (p = <.001); and for nurse executives r = .491(p = <.001).

For the purpose of the QSAAN descriptive survey study, when the 17 identified knowledge questions are viewed independently, the overall inter-item correlation coefficients of the QUISKA2 for the 17 knowledge questions was r = .27 (p = <.001). The inter-item correlation coefficients of the 17 knowledge questions for nursing roles was direct care nurses r = .174 (p = <.001); for front line leaders r = .417 (p = <.001); and for nurse executives r = -.021 (p = <.001).

Skills question analysis. The inter-item correlation coefficients of the QUISKA2 for the 45 skill questions including multiple choice and Likert-type questions was r = .61 (p = <.001). The skills questions were analyzed for applicability to the three nursing roles. The inter-item correlation coefficients of the 45 skills questions for the three levels of nursing roles was direct care nurses r = .945 (p = <.001); for front line leaders r = .948 (p = <.001); and for nurse executive r = .946 (p = <.001).

Attitude question analysis. The inter-item correlation coefficients of the QUISKA2 for the 11 attitude questions including Likert-type questions was r = .91 (p = <.001). The attitude questions were analyzed for applicability to the three nursing roles. The inter-item correlation coefficients of the 11 attitude questions for the three levels of nursing roles was direct care nurses r = .924 (p = <.001); for front line leaders r = .815 (p = <.001); and for nurse executives

$r = .682$ ($p = <.001$).

Factor Analysis of the QUISKA2 Tool

Overall Factor Analysis of the QUISKA2 Tool. Overall factor analysis was conducted in the 73 questions in the QUISKA2 instrument. See Appendix R, Varimax and Sorted Factor Analysis. The analysis extracted factors via SPSS version 20 using Principal Components Analysis (PCA) with varimax rotation method. Factor Analysis was conducted prior to PCA with varimax rotation. Inspection of the correlation matrix revealed the presence of multiple coefficients of ≥ 0.3. The Factorability of the correlation matrix was supported by a Kaiser-Meyer-Oklin value of 0.887, which exceeds the recommended value of .6 (Kaiser, 1970; 1974) and a Bartlett's Test of Sphericity (Bartlett, 1954) which reached statistical significance ($p < .001$). Principal component analysis revealed ten components (factors) with eigenvalues greater than 1, explaining 41.1%, 9.4%, 5.3%, 3.7%, 3.2%, 2.8%, 2.6%, 2.3%, 2.1% and 1.9% of the variance respectively. An eigenvalue in PCA above one suggests there is variance in a factor and would be considered valuable in assessing for factors (Polit, 2010). An inspection of the scree plot illustrated a clear break after the third component. Using Catell's (1966) scree test, the first three components were retained. These three components accounted for 56.6% of variation and were investigated further. The first factor, representing 41.1% of variation had three main focuses: interpreting, analyzing and understanding data; participation in team settings; and application of EBP. These concepts represented questions within the QSEN domains of QI, EBP, Teamwork and Collaboration, Safety and Informatics. The second factor representing 9.4% of variation included concepts of application of patient centered care, a culture of safety, and communication. These concepts represented questions within the QSEN domains of Patient

Centered Care, EBP, Teamwork and Collaboration, Safety and Informatics. The third factor representing 5.3% of variation included concepts related to informatics and patient centered care.

Factor Analysis of the Knowledge, Skills, and Attitude Subsets. Further analysis was completed to assess factor analysis for each of the subsets of knowledge, skills, and attitude sections of the QUISKA2 instrument.

Knowledge Factor Analysis. Factor analysis was completed on the 17 questions in the QUISKA2 instrument. See Table R.2: Knowledge Factor Analysis. The Kaiser-Meyer-Oklin value was 0.527, not reaching the recommended value of 0.6, however, Bartlett's Test of Sphericity did reach statistical significance ($p < .001$), supporting the factorability of the correlation matrix. Principal component analysis revealed the presence of eight components however, there were none with eigenvalues 1. The variance noted in the eight factors explained 13.4%, 11%, 10.1%, 9.5%, 8.8%, 8.4%, 7.5%, and 6.7% of the variance respectively. An inspection of the scree plot revealed a moderate break after the first component. Upon evaluation of the scree test, it was decided to retain the first three components which accounted for 34.5% of variation. The analysis found the first three factors represented consistency within the QSEN domains of Informatics and Safety knowledge and paired other domain knowledge into factors of definition (QI/EBP) representing 13.4% of the variation, critical thinking (Safety/QI) representing 11% of the variation, and application (EBP) representing 10.1% of the variation.

Skills Factor Analysis. Factor analysis was completed on the 45 skills questions in the QUISKA2 instrument. See Table R.3, Skills Factor Analysis. The Kaiser-Meyer-Oklin value was 0.927 and Bartlett's Test of Sphericity reached statistical significance ($p < .001$), supporting the factorability of the correlation matrix. Principal component analysis revealed the presence of

eight components with eigenvalues above 1, explaining 44.7%, 10.1%, 5.7%, 3.9%, 3.4%, 3.0%, 2.6%, and 2.3% of the variance respectively. An inspection of the scree plot revealed a clear break after the 4th component accounting for 64.4% of variation. These four factors were further assessed.

The first factor represented 44.7% of variability including skill concepts around team participation and training. The next factor represented 10.5% variation and included the use of information technology to extract data and the practice of patient centered care. The next two factors identified QSEN domains within subsets of QI, EBP and Informatics and represented 9.6% variation. The first of these subsets incorporated three higher level cognitive skills including application of data utilizing graphical representations of data on various graphs/charts, critical thinking in relation to data interpretation, and problem solving related to safety prevention modalities. The second factor included more commonly utilized QI processes including chart review, PDCA, Six Sigma, flowcharting, root cause analysis, Failure Mode and Effects Analysis, and error reporting systems.

Attitude Factor Analysis. Factor analysis was completed on the 11 attitude questions in the QUISKA2 instrument. See Table R.4, Attitude Factor Analysis. The Kaiser-Meyer-Oklin value was 0.914 with Bartlett's Test of Sphericity reaching statistical significance ($p < .001$), supporting the factorability of the correlation matrix. Principal component analysis revealed the presence of two components with one reaching an eigenvalues above 1, explaining 53.2%, and 9.6% of the variance respectively. An inspection of the scree plot revealed a clear break after the 2nd component. The first factor representing 53.2% variation included the importance of QI processes. The second factor representing 9.6% variance included basic care concepts

incorporating QSEN domains of Patient Centered Care, Teamwork and Collaboration, Informatics, EBP, and QI.

Practicing Nurses Knowledge of QSEN Domains

The second outcome of the QSAAN descriptive survey study was to assess practicing nurses' knowledge of identified QSEN competencies. QSEN competencies are reflected by individual questions within the QUISKA2 tool. The competency questions are categorized within each of the six QSEN domains. Each of the domains is further measured within the subsets of knowledge, skills, and attitudes. Thus, outcomes were assessed for scores within the Knowledge Skills and Attitude subsets and the six QSEN domains. In the original research study by Dycus and McKeon (2009), knowledge scores included multiple choice and true/false questions, which represented the knowledge subset and a portion of the skills subset. The QSAAN descriptive survey study separated questions to reflect the QSEN knowledge, skills, and attitude subsets individually. In order to maintain the separate subsets of knowledge, skills, and attitudes, it was decided to address these subsets distinctly as unique groups allowing for clear interpretation between identified knowledge and skill competencies. The skills subset was separated based on question type. Skills critical thinking subset included multiple choice questions with a dichotomous variable rating of 1 = correct, 0 = incorrect. The skills proficiency/frequency subset included questions with a Likert-type scale of 1 to 6 (1 = novice, 6 = expert). The scale for skills proficiency and frequency subset had the following levels of scores from 1 to 6: 1= novice (not familiar with and never used), 2 = familiar (heard of the process/term but never used), 3 = understand (have used 1to2 times), 4 = skilled (understanding of the process/term and have used 3to5 times), 5 = proficient (understand the process/term and use 6 to8 times in my work) and 6 =

expert (understand the process/term and use greater than9 times in my work and am able to teach the concept to others). The attitude subset included questions with a Likert-type scale of 1 to 4. The scale for attitude scores ranged from 1 to 4: 1= not at all important, 2 = low importance, 3 = moderate importance, 4 = high importance.

Overall Knowledge, Skills and Attitude Scores - QUISKA2. Table 5, QUISKA2 Overall Participant Scores demonstrates the overall participant scores for the QUISKA2 instrument for the main knowledge skills, and attitude subsets. Descriptive statistics were used to calculate mean scores for participant responses. The mean score for the 17 question knowledge subset for all participants was 0.72 (SD ± 0.106) based on a scale of 0 to 1 with 1 being the correct answer. Thus, 72% of the knowledge subset questions were answered correctly. The mean score for the 15 skills critical thinking subset was 0.80 (SD ± 0.140). Thus, 80 % of the skills critical thinking subset questions were answered correctly. The mean score for the 30 questions within the skills proficiency/frequency subset was 3.06 (SD ± .858). Thus, with a skills proficiency/frequency average score of 3.06, participants reported a score that was labeled as: I have an understanding of the concepts and have used them at least one to two times within the work setting. The mean score for the 11 attitude subset questions was 3.78 (SD ± 0.337). Thus, participants rated the items in the attitude subset as having above moderate importance.

Analysis of participant responses specific to the subsets will include assessment of highest and lowest scoring domains and assessment of highest and lowest scoring questions. This presentation of data is similar in style to the original research (Dycus & McKeon, 2009) and supports the ability to compare the two research studies using both the QuISKA and QUISKA2 instruments.

Table 5

QUISKA2 Overall Participant Scores

QUISKA2 Overall Participant Scores							
Overall KSA scores	Mean	SD	*n*	Min	Max	Skew	Kurtosis
Overall Knowledge[a]	0.72	0.106	17	0.35	1.00	-0.285	0.171
Overall Skills[a] - Critical Thinking	0.80	0.140	15	0.27	1.00	-0.899	0.943
Overall Skills[b] - Proficiency/Frequency	3.06	0.858	30	1.00	5.30	0.385	-0.376
Overall Attitude[c]	3.78	0.337	11	1.00	4.00	-4.090	26.721

n = number of questions in subsets, [a] Scale of 0 to 1, [b] Scale of 1 to 6 (1 = novice and 6 = expert), [c] Scale of 1 to 4 (1= not important at all and 4 = high importance)

Knowledge Subset. Descriptive statistics were completed for each QSEN domain within the knowledge subset. See Table 6, QUISKA2 Participant Scores - Knowledge for participant scores within each of the QSEN domains. The scale for scoring for the multiple choice questions was 1 = correct answer, 0 =incorrect answer. The highest knowledge mean scores were for the QSEN domains of Teamwork and Collaboration (0.93), Informatics (0.79), Patient Centered Care (0.75), and EBP (0.74), while mean scores were lowest for Safety (0.60), and QI (0.69). The highest scoring questions were: 1) (EBP domain) patient outcomes improve when healthcare providers know how to find, critically appraise, and incorporate EBP (0.99); 2) (QI domain) a good way to change a care process is to pilot the new process and evaluate the results before implementing changes in all areas/units of care (0.98); and 3) (Safety domain) example of culture of safety in a healthcare organization (0.95). Five of 17 questions (29.4%) demonstrated mean scores above 0.90 and included questions from each of the QSEN domains except Informatics.

The lowest mean scores in the knowledge subset presented as; 1) (Safety domain) culture of safety actions in near-miss (0.24); 2) (EBP domain) source that provides the strongest level of support for EBP (0.34); 3) (QI domain) tool to understand process variation within clinical process such as difference in the interval from the time from order to the first dose of an antibiotic (0.38). Six of 17 questions (35.3%) had a mean score of 0.56 or lower representing all the QSEN domains except Teamwork and Collaboration, and Informatics. Quality Improvement domain questions represented 50% of the lowest means questions.

Table 6

QUISKA2 Participant Scores - Knowledge

QUISKA2 Participant Scores - Knowledge							
Knowledge[a]	Mean	SD	*n*	Min	Max	Skew	Kurtosis
QI	0.69	0.394	6	0.00	1.00	-1.714	6.546
Safety	0.60	0.236	2	0.00	1.00	-1.427	6.987
EBP	0.74	0.290	3	0.00	1.00	-5.080	61.03
Teamwork & Collaboration	0.93	0.248	1	0.00	1.00	-3.524	10.479
Informatics	0.79	0.386	3	0.00	1.00	-1.654	1.289
Patient Centered Care	0.75	0.368	2	0.00	1.00	-1.974	4.961

n = number of questions in subsets, [a] Scale of 0 to 1

Skills Critical Thinking Subset. Descriptive statistics were completed for each QSEN domain within the skills subset for both the 15 critical thinking (multiple choice) skills questions and separately for 30 skills proficiency/ frequency (Likert-type) assessments. See Table 7 for frequencies scores for the QUISKA2 Participant Scores - Skills Critical Thinking questions within the QSEN domains. The scoring scale for the multiple choice questions was 1 equals correct, 0 equals incorrect. The highest skills mean scores for multiple choice questions were for the QSEN domains of Safety (0.86), Patient Centered Care (0.84) and EBP (0.81). The lowest

scoring mean results were Teamwork and Collaboration (0.74). The highest scoring questions were: 1) (Teamwork and Collaboration domain) when it is important to communicate (0.98); 2) (Teamwork and Collaboration domain) teamwork and patient safety enhanced scenario (0.94); and 3) (EBP domain) practice guidelines (0.93). The lowest scoring means were: 1) (Teamwork and Collaboration domain) standardized approaches to hand-off communication between caregivers (0.52); 2) (Teamwork and Collaboration domain) teamwork and medication errors examples except (0.55); and 3) (EBP domain) Research survey review (0.61). There were no multiple choices or true/false questions for the Informatics domain.

Table 7

QUISKA2 Participant Scores - Skills Critical Thinking

QUISKA2 Participant Scores - Skills Critical Thinking							
Skills[a] - Critical Thinking	Mean	SD	*n*	Min	Max	Skew	Kurtosis
QI	0.80	0.406	2	0.00	1.00	1.454	0.025
Safety	0.86	1.000	2	0.00	1.00	-2.092	2.390
EBP	0.81	0.346	3	0.00	1.00	-2.214	4.587
Teamwork & Collaboration	0.74	0.364	5	0.00	1.00	-2.521	12.847
Informatics	.	.	0	.	.	.	.
Patient Centered Care	0.84	0.349	3	0.00	1.00	-2.123	3.174
n = number of questions in subsets, [a] Scale of 0 to 1, CT = Critical Thinking							

Skills Proficiency/Frequency Subset. Descriptive statistics were completed for each QSEN domain within the skills subset for the 30 proficiency and frequency of display of skills questions. See Table 8, QUISKA2 Participant Scores - Skills Proficiency/Frequency for frequency scores for participants within the QSEN domains. The highest skills mean scores for proficiency/frequency questions were for the QSEN domains of Patient Centered Care (4.69) and Teamwork and Collaboration (4.18). The lowest scoring means were EBP (2.51) and QI (2.65).

There were no questions for the Safety domain. The highest scoring questions were: 1) (Patient Centered Care domain) Patient Centered Care (4.84); 2) (Teamwork and Collaboration domain) assuming the role of team member (4.75); and 3) (Informatics domain) Electronic Medical Records (4.59). The lowest mean scores were within the EBP domain and included questions related to more complex statistical analysis strategies, in particular, ANOVA (1.52), regression analysis (1.62), and Chi Square (1.66). Six of the 30 or 20% of skills proficiency questions rated below the scale level of 2 which is labeled Familiar - heard of the process or term but never used. All of the Teamwork and Collaboration, Patient Centered Care and Informatics domain mean scores were greater than 3.96 with the exception of team training (3.57) and Computerized Physician Order Entry (2.86).

Table 8

QUISKA2 Participant Scores - Skills Proficiency/Frequency

QUISKA2 Participant Scores - Skills Proficiency/ Frequency							
Skills[a] - Proficiency/Frequency	Mean	SD	*n*	Min	Max	Skew	Kurtosis
QI	2.65	1.366	11	1.00	6.00	0.628	-0.170
Safety	.	.	.	.	.	.	.
EBP	2.51	1.366	10	1.00	6.00	0.628	1.294
Teamwork & Collaboration	4.18	1.280	3	1.00	6.00	-0.529	-0.304
Informatics	3.94	1.306	4	1.00	6.00	-0.359	-0.212
Patient Centered Care	4.69	1.086	2	1.00	6.00	-0.769	0.328

n = number of questions in subsets, [a]Scale of 1 to 6 (1 = novice and 6 = expert).

Attitude Subset. Descriptive statistics were completed for each QSEN domain within the 11 attitudes subset questions. See Table 9, QUISKA2 Participant Scores - Attitude for the frequency scores for participants for the QSEN domains. Answers were based on a scale of 1 to 4 with 1 = not important at all, 2 = low importance, 3 = moderate importance, 4 = high importance.

The highest attitude mean scores were the QSEN domains of Teamwork and Collaboration (3.90) and Patient Centered Care (3.84). The lowest mean scoring domains were EBP (3.66) and Safety (3.74). The highest mean scoring questions were in the Teamwork and Collaboration domain: 1) importance of teamwork (3.91), and 2) importance of teamwork and collaboration to improve patient outcomes (3.89). The lowest mean scores were: 1) (EBP domain) importance of reading current literature on practice (3.54), and 2) importance of nurse involvement in information technology to support patient care (3.72). All the attitude questions rated at the high end of moderate importance.

Table 9

QUISKA2 Participant Scores - Attitude

QUISKA2 Participant Scores - Attitude							
Attitudes[a]	Mean	SD	*n*	Min	Max	Skew	Kurtosis
QI	3.76	0.484	2	1.00	4.00	-2.119	5.643
Safety	3.74	0.504	1	1.00	4.00	-2.027	0.254
EBP	3.66	0.531	2	1.00	4.00	-1.730	4.074
Teamwork & Collaboration	3.90	0.365	2	1.00	4.00	-4.498	25.255
Informatics	3.72	0.501	1	1.00	4.00	-1.831	4.144
Patient Centered Care	3.84	0.431	3	1.00	4.00	-3.359	14.052
Abbreviations: QI, quality improvement; EBP, evidence based practice							
n = number of questions in subsets, [a] Scale of 1 to 4 (1 = not important at all and 4 = high importance).							

Overall Familiarity Scores

The original research study by Dycus and McKeon calculated an overall knowledge score of individual QSEN domains by combining the mean scores of the 32 multiple choice and true/false questions within the QuISKA tool (Dycus & McKeon, 2009). This calculation was

used to produce an overall rating that identified the QSEN domain that had the highest overall score or the highest familiarity.

The QSAAN descriptive survey study also completed an assessment of familiarity to establish the QSEN domain with the highest mean scores for participants. The 32 multiple choice and true/false questions represent the questions within the Knowledge and Skills Critical Thinking subsets of the QUISKA2 tool. The multiple choice and true false questions were scored on a 0 to 1 scale for each of the QSEN Domains. The Knowledge and Skills Critical Thinking subsets scores were combined for a single mean score as seen on Table 10, QUISKA2 QSEN Domains Participant Familiarity Scores. Additional mean scores were gathered for the questions within the Skills Proficiency/ Frequency subset. The Proficiency/ Frequency questions were scored on a 1 to 6 scale. The combined Knowledge/Skills Critical Thinking scores and the Skills Proficiency/ Frequency scores were added together to establish a new score that was classified as the familiarity score. The familiarity score was determined for each of the QSEN domains. The QSEN domains that demonstrated the highest familiarity was Patient Centered Care (5.498, SD ± 0.584) and Teamwork and Collaboration (4.947, SD ± 0.643) while Evidenced Based Practice (3.290, SD ± 0.555) and Quality Improvement (3.361, SD ± 0.646) were the lowest scores. Note that the QSEN domain of Safety did not have a proficiency/frequency score, which also resulted in no familiarity score. The familiarity analysis did not include the attitude subset. The attitude subset was intended to measure participants' attitudes or the level of importance that nurses have toward certain topics. The attitude scores are thus not a reflection of knowledge or skill around the QSEN competencies and where therefore excluded from the familiarity score calculation.

Table 10

QUISKA2 QSEN Domains Participant Familiarity Scores

QUISKA2 QSEN Domains Participant Familiarity Scores							
		Quality Improvement	EBP	Safety	Teamwork and Collaboration	Patient Centered Care	Informatics
Mean	Knowledge & Skills Critical Thinking	.71	.78	.73	.77	.80	.79
Mean	Proficiency/ Frequency	2.647	2.513	.	4.176	4.694	3.937
Familiarity Score		3.361	3.290	.	4.947	5.498	4.730
SD	Knowledge & Skills Critical Thinking	.225	.153	.195	.168	.185	.941
SD	Proficiency/ Frequency	1.068	0.957	.	1.119	0.984	0.941
SD Calculation		0.646	0.555	.	0.643	0.584	0.941

Nursing Roles

The third outcome of QSAAN was to assess differences in scores between the three identified nursing roles of acute care practicing nurses. In addition, the research question that prompted this analysis was to assess each nursing role's average knowledge of quality and safety, and performance of competencies within the QSEN domains. A general linear regression (GLR) was run with an alpha of .05. The data were split by the nursing role variable. The variables selected for the GLR were facility, unit of work, level of education, certification, years from nursing school and prior QI training. Outcomes were analyzed for the 73 question overall QUISKA2 tool and within each of the QSEN subsets of knowledge, skills, and attitudes.

Nursing Role Overall QUISKA2. A statistical significant was found between the three nursing roles (p = < 0.001) when compared with the other nursing roles (Table 11, Nursing Role QUISKA2). Each hierarchal change in nursing role resulted in a statistically significant higher means score. Direct care nurses had lower scores than front line leaders and nurse executives. Front line leaders had higher scores than direct care nurses, but lower scores than nurse executives. Nurse executives had higher scores than both direct care nurses and front line leaders. Table 12, QUISKA2 Nursing Role- Scores shows the frequency scores for the three nursing roles.

Table 11

Nursing Role - QUISKA2

Nursing Role - QUISKA2						
Nursing Role (A)	As compared to (B)	Mean Difference (A-B)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Direct Care Nurses	Front Line Leaders	-.1733*	.04147	<.001	-.2730	-.0735
	Nurse Executives	-.5420*	.07016	<.001	-.7108	-.3733
Front Line Leaders	Direct Care Nurses	.1733*	.04147	<.001	.0735	.2730
	Nurse Executives	-.3687*	.07480	<.001	-.5486	-.1889
Nurse Executives	Direct Care Nurses	.5420*	.07016	<.001	.3733	.7108
	Front Line Leaders	.3687*	.07480	<.001	.1889	.5486

Based on observed means. The error term is Mean Square (Error) = .123.

*. The mean difference is significant at the .05 level.

Table 12

QUISKA2 Nursing Role Scores

QUISKA2 - Nursing Role Scores							
Nursing Role	Mean	SD	*n*	Min	Max	Skew	Kurtosis
Direct Care	2.072	.340	235	1.07	3.12	0.243	0.307
Front Line Leader	2.245	.374	103	1.41	3.08	-0.048	-0.612
Nurse Executive	2.614	.359	28	1.68	3.14	-0.702	0.274

Additional analysis was completed to assess the relationship of nursing role to the separate knowledge, skills, and attitude subsets. See Appendix S, Nursing Role between Role Comparisons Tables.

Nursing Role Knowledge Subset. The scores from the 17 questions within the knowledge subset were used to compare the three nursing roles with the variables of facility, level of education, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the three nursing roles in the knowledge subset (p = < .001). Direct care nurses had significantly lower scores than front line leaders (p = < .001, CI = -0.0786, - 0.0195) and lower scores than nurse executives (p = 0.057, CI = -0.0990, 0.0010). Statistical significance was also found within the various individual nursing roles in the knowledge subset when compared to levels of education and previous QI training variables. See Table 13, Nursing Role - Knowledge Scores for the overall scores of the three nursing roles.

The nursing role of direct care nurses was significant for level of education (p = 0.019, CI = -0.665, 0.750*)*. Direct care nurses with an associate degree had lower mean scores than BSN nurses (p = 0.042, CI = -0.0863, -0.0008) and MS/ MSN nurses (p = 0.043, CI = -0.1685, -0.0014). Additional comparison of nursing role to level of education for the knowledge subset is available in Appendix T, Nursing Role to Level of Education Comparison - Knowledge.

Front line leaders who reported previous QI training had significantly higher mean scores (0.78) than those without previous QI training (0.73) (p = 0.044, CI = 0.733, 0.777). See Appendix U, Nursing Role - Knowledge Subset for results of nursing role comparison to other independent variables.

Table 13

Nursing Role - Knowledge Scores

Nursing Role - Knowledge Scores				
			95% Confidence Interval	
Nursing Role	Mean	Std. Error	Lower Bound	Upper Bound
Direct Care	.709	.007	.696	.723
Front Line Leader	.755	.011	.733	.777
Nurse Executive	.755	.024	.706	.804

Nursing Role Skills Critical Thinking Subset. The scores from the 15 questions within the skills critical thinking subset were used to compare the three nursing roles with the variables of facility, level of education, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the skills critical thinking subset was run with an alpha of .05. Post hoc analysis was

completed using Bonferroni. Statistical significance was noted between the three nursing roles in the skills critical thinking subset (p = < .001). Direct care nurses had significantly lower scores than front line leaders (p = 0.017, *CI* = -0.08385, -0.0060) and nurse executives (p = 0.001, *CI* = -0.1656, -0.0339). Statistical significance was also found within the various individual nursing roles in the skills critical thinking subset to unit of work and level of education variables. Overall nursing role scores to the skills critical thinking subset are noted on Table 14, Nursing Role - Skills Critical Thinking Scores.

Table 14

Nursing Role Skills Critical Thinking Scores

Nursing Role - Skill Critical Thinking Scores				
Nursing Role	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Direct Care	.776	.010	.758	.795
Front Line Leader	.819	.012	.795	.844
Nurse Executive	.886	.033	.818	.954

The front line leaders nursing role showed a relationship when compared to the independent variable of unit of work. Front line leaders in the ambulatory setting had significantly lower scores than front line leaders who worked in the leadership unit of work (p = 0.009, *CI* = -0.4585, -0.0331). Although not significantly significant, front line leaders in the ambulatory unit of work also had lower mean scores than front line leaders in the perioperative area (p = 0.58 *CI* = -0.4364, 0.0030) and support areas (p = 0.61 *CI* = -0.4146, 0.0041).

The effects of nursing role and level of education on the skills critical thinking questions were examined. The nursing role of direct care nurses found a statistical significance with level of education (p = 0.002). Post hoc analysis found within the direct care nursing role, nurses with an associate degree scored significantly lower than nurses with higher degrees of a BSN (p = 0.002, *CI* = -0.1397, -0.0193) and MSN (p = 0.048, *CI* = -0.2360, -0.0006). Post hoc analysis was completed after consolidating the level of education variable within the direct care nursing role from the original six levels into five levels, with doctorate degree group (n = 1) collapsed into the MSN level. Appendix V, Nursing Role to Level of Education Comparison - Skills Critical Thinking displays all three nursing role group comparisons to level of education.

Although not statistically significant, the relationship between mean scores of front line leaders with certification (0.8387) and those without certification (0.7951) may warrant additional attention (p = 0.079). Results of nursing role to other variables are found in Appendix W, Nursing Role - Skills Critical Thinking- Subset.

Nursing Role Skills Proficiency/Frequency Subset. The scores from the 30 questions within the skills proficiency/frequency subset were used to compare the three nursing roles with the variables of facility, level of education, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the three nursing roles in the skills proficiency/frequency subset (p = < .001). Direct care nurses had significantly lower scores than front line leaders (p = 0.002, *CI* = -0.5563, -0.1026) and nurse executives (p = < 0.001, *CI* = -1.5546, -0.7871) and front line leaders had significantly lower scores than nurse

executives (p = < 0.001, *CI* = -1.2505, -0.4323). Statistical significance was also found in the skills proficiency/ frequency subset when nursing role was compared to the level of education and previous QI training variables. Overall scores for nursing role skills proficiency/frequencies are found on Table 15, Nursing Role Skills Proficiency/Frequency Scores.

Table 15

Nursing Role Skills Proficiency/Frequency Scores

Nursing Role - Skills Proficiency/Frequency Scores				
			95% Confidence Interval	
Nursing Role	Mean	Std. Error	Lower Bound	Upper Bound
Direct Care	2.912	.048	2.817	3.007
Front Line Leader	3.158	.079	3.002	3.315
Nurse Executive	3.853	.224	3.392	4.315

The nursing role skills proficiency/ frequency subset had statistical significance for each of the three nursing roles; direct care nurses (p < 0.001), front line leaders (p = 0.003) and nurse executives (p = 0.006). See Appendix X, Nursing Role to Level of Education Comparison - Skills Proficiency/ Frequency. In the direct care nursing role, nurses with a MSN had significantly higher scores than nurses with lower levels of education; diploma (p <.0.001, *CI* = .4221, 2.1293), associate degree (p <.0.001, *CI* = .3182, 1.5382), and BSN (p <.0.001, *CI* = .4959, 1.6492). In the front line leader nursing role, nurses with a MSN had significantly higher scores than diploma nurses (p = 0.001, *CI* = 0.1674, 2.1440) and associate degree nurses (p = 0.028, *CI* = 0.0490, 1.5397). In the nurse executive nursing role, doctorally prepared nurses had significantly higher scores than BSN nurses (p = 0.004, *CI* = 0.4190, 2.8299). MSN nurses in the

nurses executive nursing role demonstrated higher scores than BSN prepared nurses, although not reaching statistical significance ($p = 0.077$).

Acute care practicing nurses in the direct care and front line leader roles who have had previous QI training had significantly higher scores than those without previous QI training in the direct care group ($p = < 0.001$), and front line leader group ($p = < 0.001$). In addition, results of nursing role scores for Skills Proficiency/Frequencies in comparison to facility, level of education, unit of work, certification, years from nursing school and previous QI training is available in Appendix Y, Nursing Role - Skills Proficiency/Frequency Subset.

Nursing Role Attitude Subset. The scores from 11 questions within the attitude subset were used to compare the three nursing roles with the variables of facility, level of education, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the three nursing roles in the attitude subset ($p = .001$). Direct care nurses had significantly lower scores than front line leaders ($p = 0.011$, $CI = -0.2084, -0.0202$) and nurse executives ($p = 0.012$, $CI = -0.3512, -0.0328$). Statistical significance was also found within the various individual nursing roles in the attitude subset when compared to unit of work.

In the nursing role attitude subset, unit of work was significant for the nurse executive role ($p = 0.038$) and within units in the front line leader groups ($p = 0.044$). The front leaders from the emergency care areas had significantly lower mean scores than the front line support group leaders (Quality Improvement nurses, Educators, Case Managers) ($p = 0.044$, $CI = -$

0.6549, -0.0040). In the nurse executive group, the ICU/SDU leaders mean scores were the highest (4.00) and the medical/surgical nursing executive leaders mean scores were the lowest (3.73). Appendix Z, Nursing Role to Level of Education - Attitude shows other comparison scores of nursing role to level of education. Overall scores for the nursing role attitude subset are included on Table 16, Nursing Role - Attitude Scores. Additional results for the nursing role comparison to facility, certification, years from nursing school and previous QI training can be seen on Appendix AA, Nursing Role - Attitude Subset.

Table 16

Nursing Role - Attitude Scores

Nursing Role - Attitude Scores				
			95% Confidence Interval	
Nursing Role	Mean	Std. Error	Lower Bound	Upper Bound
Direct Care	3.740	.025	3.691	3.790
Front Line Leader	3.851	.023	3.806	3.897
Nurse Executive	3.892	.032	3.826	3.958

Levels of Education

The fourth outcome of QSAAN was to assess differences between academic degree of knowledge and utilization of QSEN subsets of knowledge, skills, and attitudes. Additional analysis were done to assess for level of education within three levels of nursing roles including direct care, front-line leader and nursing executive. A general linear regression (GLR) was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. The data were split by

level of education. The variables selected for the GLR were facility, nursing role, unit of work, certification, years from nursing school and prior QI training.

Levels of Education - Overall QUISKA2. A significant relationship was found with the independent variable levels of education and mean scores on the QUISKA2 (p = <0.001). In the 73 questions QUISKA2 tool each of the levels of education demonstrated statistical significance to at least three other levels of education. Diploma nurses had significantly lower scores than nurses with an MSN (p = < 0.001, *CI* = -0.7958, -0.2558), Master's in another field (p = < 0.001, *CI* = -0.8641, -0.1659), and nurses with a doctorate degree (p = < 0.001, *CI* = -1.4412, -0.5177). Associate degree nurses had significantly lower scores than MSN (p = < 0.001, *CI* = -0.6106, -0.2534), Master's in another field (p = < 0.001, *CI* = -0.75056, -0.1369), and nurses with a doctorate degree (p = < 0.001, *CI* = -1.3007, -0.4707). BSN nurses had significantly lower scores than nurses with a higher degree MSN (p = < 0.001, *CI* = -0.5746, -0.2624), Master's in another field (p = < 0.001, *CI* = -0.6785, -0.1370), and nurses with a doctorate degree (p = < 0.001, *CI* = -1.2780, -0.4663). MSN nurses had significantly lower scores than nurses with a doctoral degree (p = < 0.025, *CI* = -0.8774, -0.0300). See Table 17, QUISKA2 Levels of Education Scores for mean scores for each of the levels of education. Additional scores of all educational levels is found in Appendix BB, Level of Education - KSA.

Table 17,

QUISKA2- Level of Education Scores

QUISKA2 - Level of Education Scores							
Level of Education	Mean	SD	*n*	Min	Max	Skew	Kurtosis
Diploma	1.9772	.31358	18	1.53	2.55	.513	-1.147
Associate	2.0710	.35336	78	1.07	2.85	-.004	.033
BSN	2.0844	.32250	201	1.08	2.95	.129	-.084
MS/ MSN	2.5029	.34944	49	1.60	3.12	-.398	-.007
Master's Other	2.4922	.33655	14	1.71	3.08	-.632	1.447
Doctorate	2.9566	.16987	6	2.70	3.14	-.717	-.906
Abbreviations: BSN, Bachelor of Science Nursing; MS/MSN, Master of Science/ Master of Science in Nursing							

Level of Education - Knowledge Subset. The scores from the 17 questions within the knowledge subset were used to compare the level of education degrees with the variables of facility, nursing role, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the levels of education in the knowledge subset (p = 0 .001). Associate degree nurses had significantly lower scores than BSN nurses (p = 0.009, CI = -0.0890, - 0.0071) and MSN nurses (p = 0.001, CI = -0.1335, -0.0216). Statistical significance was also found within the various individual academic degrees in the knowledge subset when compared to nursing role. A nurse with a BSN in the role of front line leader role had significantly higher mean scores than a direct care nurse with a BSN (p = 0.006, CI = 0.0122, 0.958). Although not as strong of a relationship, associate degree nurses in the front line leader role (0.7243) scored higher than direct care associate degree nurses (0.6775) (p =

0.087). See Table 18, Level of Education - Knowledge Scores for the mean scores for each level of education in the Knowledge subset. Additional results for level of education- knowledge subset as compared to facility, unit of work, certification, years from nursing school and prior QI education can be found in Appendix CC, Level of Education - Knowledge Subset.

Table 18

Level of Education - Knowledge Scores

Level of Education - Knowledge Scores							
Level of Education	Mean	SD	*n*	Min	Max	Skew	Kurtosis
Diploma	.7059	.09464	18	.53	.88	.000	.542
Associate	.6855	.10159	78	.35	.88	-.640	.412
BSN	.7328	.10701	201	.47	1.00	-.289	.009
MS/ MSN	.7623	.09899	49	.53	1.00	.039	.136
Master's Other	.7689	.09362	14	.59	.94	-.135	.007
Doctorate	.7451	.11567	6	.59	.88	-.254	-1.828
Total	.7334	.10192	366	.51	0.93	-.2131	-.120

Abbreviations: BSN, Bachelor of Science Nursing; MS/MSN, Master of Science/ Master of Science in Nursing

Level of Education - Skills Critical Thinking Subset. The scores from the 15 questions within the skills critical thinking subset were used to compare the level of education degrees with the variables of facility, nursing role, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the levels of education in the skills critical thinking subset (p = < 0 .001). Associate degree nurses had significantly lower scores than BSN nurses (p = < 0.001, CI = -0.1311, - 0.0252), MSN nurses (p = < 0.001, CI = -

0.2003, -0.0556), and Master's other nurses (p = 0.020, CI = -0.2411, - 0.0107). Statistical significance was also found within the various individual academic degrees in the skills critical thinking subset when compared to unit of work, years from nursing school and prior QI training. When comparing level of education and unit of work, nurses with a Master's degree not in nursing had significantly higher levels of critical thinking skills scores in the Perioperative area with a mean score of (0.9333) versus those in the medical surgical area (0.6667) (p = 0.024). Nurses with a Master's degree not in nursing who had previous QI training had significantly higher mean scores (.8933) than nurses without previous QI training with Master's degree not in nursing (.7500) (p = 0.014). MSN degree nurses who are > 20 years from nursing school had significantly higher mean scores (0.8828) than MSN nurses who are 11 to 20 years from nursing school (0.7630) (p = 0.039). Table 19, Level of Education - Skills Critical Thinking Scores lists the frequency descriptive for each level of education in the skills critical thinking subset. Additional data for level of education- skills critical thinking subset as compared to facility, nursing role, and certification are found in Appendix DD, Level of Education - Skills Critical Thinking Subset.

Table 19

Level of Education - Skills Critical Thinking Scores

Level of Education - Skills Critical Thinking Scores							
Level of Education	Mean	SD	*n*	Min	Max	Skew	Kurtosis
Diploma	.7889	.14507	18	.47	1.00	-.608	-.276
Associate	.7256	.14574	78	.27	1.00	-.752	.890
BSN	.8046	.13507	201	.27	1.00	-1.014	1.244
MS/ MSN	.8544	.11440	49	.53	1.00	-.837	.318
Master's Other	.8524	.10518	14	.67	1.00	-.276	-.962
Doctorate	.8778	.12232	6	.73	1.00	-.362	-2.103
Total	.8173	.12796	366	.49	1.00	-.641	-.148
Abbreviations: BSN, Bachelor of Science Nursing; MS/MSN, Master of Science/ Master of Science in Nursing							

Level of Education - Skills Proficiency/Frequency Subset. The scores from the 30 questions within the skills proficiency/frequency subset were used to compare the level of education degrees with the variables of facility, nursing role, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the levels of education in the skills proficiency/ frequency subset (p = < 0 .001). Diploma nurses had significantly lower scores than MSN nurses (p = < 0.001, *CI* = -1.8122, - 0.5895), Master's other nurses (p = < 0.001, *CI* = -1.9385, -0.3577), and doctorate degree nurses (p = < 0.001, *CI* = -3.3382, - 1.2470). Associate degree nurses had significantly lower scores than MSN nurses (p = < 0.001, *CI* = -1.2942, - 0.4856), Master's other nurses (p = 0.002, *CI* = -1.4810, -0.1934), and doctorate degree nurses (p = < 0.001, *CI* = -2.9213, - 1.0419). BSN nurses had significantly

lower scores than MSN nurses (p = < 0.001, *CI* = -1.2748, - 0.5681), Master's other nurses (p = 0.001, *CI* = -1.4818, -0.2556), and doctorate degree nurses (p = < 0.001, *CI* = -2.9321, - 1.0943). Doctorate degree nurses had significantly higher scores than MSN nurses (p = 0.013, *CI* = 0.1324, 2.0511) and Master's other nurses (p = 0.029, *CI* = 0.0621, 2.2267).

Statistical significance was also found within the various individual academic degrees in the skills proficiency/frequency subset when compared to facility, nursing role and prior QI training. BSN nurses at facility C had higher skills proficiency/ frequency scores than BSN nurses at facility B (p = 0.002, *CI* = 0.1611, 0.984) and facility D (p = 0.026, *CI* = 0.0324, 0.7935). Doctorally prepared nurses at facility B had lower skills proficiency/ frequency scores than doctorally prepared nurses at facility D (p = 0.045, *CI* = -0.983, -*0*.017). Direct care nurses with a BSN had a lower score in skills proficiency/frequency than front line leaders with a BSN (p = .004, *CI* -0.6543, -0.1058*)*. Nurses with prior QI training had significantly higher skills proficiency/frequency scores in the levels of education including associate degree (p = 0.005), BSN (p < 0.001), and MSN (p = 0.008). No comparison occurred within the doctorate level as all doctorally prepared nurses had previous QI training. Table 20, Level of Education - Skills Proficiency/Frequency QI Training Scores shows mean scores for the various levels of education for those with and without declared QI training along with the number of participants in each category of educational degree.

Table 20

Level of Education - Skills Proficiency/Frequency QI Training Scores

Level of Education - Skills Proficiency/ Frequency QI Training Scores					
Level of Education	Prior QI training	Mean	SD	N	Sig
Diploma	Yes	2.763	0.6757	12	0.153
	No	2.272	0.6118	6	
ADN	Yes	3.182	0.8364	37	0.006
	No	2.670	0.7428	41	
BSN	Yes	3.149	0.7365	87	< 0.001
	No	2.676	0.6390	114	
MS/ MSN	Yes	3.989	0.728	35	0.008
	No	3.335	0.7958	14	
Master's other	Yes	3.893	0.8480	10	0.289
	No	3.391	0.4228	4	
Doctorate	Yes	4.894	0.3336	6	.

Abbreviations: ADN, Associate Degree Nursing; BSN, Bachelor of Science in Nursing; MS, Master of Science; MSN, Master of Science in Nursing

Additionally, Table 21, Level of Education - Skills Proficiency/Frequency Scores lists additional data for each level of education in the Skills Proficiency/Frequency subset. Additional scores for level of education- knowledge subset as compared to certification and years from nursing school can be found in Appendix EE, Level of Education - Skills Proficiency/Frequency Subset.

Table 21

Level of Education - Skills Proficiency/Frequency Scores

Level of Education - Skills Proficiency/Frequency Scores							
Level of Education	Mean	SD	*n*	Min	Max	Skew	Kurtosis
Diploma	2.6000	.68006	18	1.63	3.80	.471	-1.166
Associate	2.9132	.82449	78	1.00	5.00	.302	-.170
BSN	2.8813	.72042	201	1.23	5.00	.385	-.233
MS/ MSN	3.8027	.79750	49	2.00	5.23	-.222	-.419
Master's Other	3.7500	.77103	14	1.93	5.13	-.594	1.793
Doctorate	4.8944	.33361	6	4.40	5.30	-.302	-.699
Total	3.4736	.68785	366	2.03	4.91	0.00678	-0.149
Abbreviations: BSN, Bachelor of Science Nursing; MS/MSN, Master of Science/ Master of Science in Nursing							

Level of Education - Attitude Subset. The scores from the 11 questions within the attitude subset were used to compare the level of education degrees with the variables of facility, nursing role, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the levels of education in the attitude subset (p = 0 .020). Post hoc analysis showed that BSN had lower scores of importance than MSN although not reaching a level of significance (p = .071, *CL* = -0.3074, 0.0059). In level of education attitude subset associate degree nursing in support services had higher attitude scores (4.0) than associate degree nurses in the leadership unit (2.8182) (p = 0.48). In addition, associate degree nurses six to ten years from nursing school had significantly lower attitude scores than associate degree nurses with 11 to 20 years (p = 0.005, *CI* = -0.5433, -0.0627) or with > 20 years

(p = 0.004, CI = -0.4940, -0.0616). Nurse executives with a BSN scored higher (3.927) in attitude questions than direct care nurses with a BSN (3.706) (p = .063) while not significant, this may be of interest for future studies. Table 22, Level of Education - Attitude Scores shows further data for each level of education in the Attitude subset. Additional scores for level of education- knowledge subset as compared to certification and years from nursing school can be found in Appendix FF, Level of Education -Attitude Subset.

Table 22

Level of Education - Attitude Scores

Level of Education - Attitude Scores							
Level of Education	Mean	SD	*n*	Min	Max	Skew	Kurtosis
Diploma	3.8636	.15035	18	3.55	4.00	-.658	-.810
Associate	3.7494	.29089	78	2.82	4.00	-1.516	1.703
BSN	3.7454	.39689	201	1.00	4.00	-4.038	23.186
MS/ MSN	3.8961	.15963	49	3.45	4.00	-1.506	1.244
Master's Other	3.9610	.04669	14	3.91	4.00	-.325	-2.241
Doctorate	3.9242	.08938	6	3.82	4.00	-.456	-2.390
Total	2.1622	.38122	366	1.62	2.95	-0.185	-0.111
Abbreviations: BSN, Bachelor of Science Nursing; MS/MSN, Master of Science/ Master of Science in Nursing							

Unit of Work or Areas of Specialty

The fifth outcome of QSAAN was to assess differences between unit of work and the knowledge, skills, and attitudes subsets within the QSEN domains. Additional analysis were done to assess for unit of work within three levels of nursing roles including direct care, front-line leader and nursing executive. A general linear regression was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. The data was split by unit of work. The variables

selected for the GLR were facility, nursing role, level of education, certification, years from nursing school and prior QI training. Outcomes were analyzed for the 73 questions in the QUISKA2 and within each of the subsets of knowledge, skills, and attitudes. See Appendix GG, Unit of Work - QUISKA2.

Unit of Work Overall QUISKA2. Statistical significance was noted between the nine units of work or areas of specialty in the QUISKA2 tool (p = < 0 .001). Nurses who reported that they worked in the leadership area of specialty had significantly higher scores than five other areas or units of work within the facilities including; medical surgical *(*p < 0.001, *CI* = 0.1239, 0.6061), ICU/SDU *(* p < 0.001, *CI* = 0.2032, 0.7113), perioperative areas *(* p = 0.013, *CI* = 0.0315, 0.5684), emergency areas *(* p < 0.001, *CI* = 0.1197, 0.6914), and ambulatory areas *(* p = 0.004, *CI* = 0.0673, 0.7027). See Table 23, Unit of Work - QUISKA2.

Table 23

Unit of Work - QUISKA2

Unit of Work - QUISKA2						
Unit of Work (A)	As Compared to (B)	Mean Difference (A-B)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Leadership	Medical/ Surgical	.3650*	.07482	<.001	.1239	.6061
	ICU/SDU	.4573*	.07884	<.001	.2032	.7113
	Periop	.2999*	.08332	.013	.0315	.5684
	Emergency Care	.4055*	.08870	<.001	.1197	.6914
	OB/GYN/NICU	.2725	.09859	.216	-.0451	.5902
	Pediatrics, Rehab, Psychiatry	.3163	.10407	.092	-.0191	.6516
	Ambulatory	.3850*	.09859	.004	.0673	.7027
	Support Services	.1995	.09859	1.000	-.1182	.5172

Based on observed means. The error term is Mean Square(Error) = .133.
*. The mean difference is significant at the 0.05 level.

Unit of work variable as compared to nursing role showed statistical significance in five different locations within the acute care setting. In the ICU/SDU units direct care nurses had significantly lower mean scores than front line leaders (p = < 0.001, CI = -1.3661, -0.3770) and nurse executives (p = 0.002, CI = -1.3661, -0.2645). In the emergency care areas nurse executives had significantly higher mean scores than front line leaders or direct care nurses (p = < 0.001). Sample size prevented completion of post hoc analysis for this unit. In the OB/GYN/NICU area direct care nurses had significantly lower mean scores than front line leaders (p = 0.043, CI = -0.8231, 0.0121). In the support areas of the hospitals direct care nurses had significantly lower scores than nurse executives (p = 0.045, CI = -1.9868, -0.0178). In the leadership area of work, front line leaders had significantly lower mean scores than nurse executives (p = 0.035). See Table 24, Unit of Work Participant Scores by Nursing Role for further detail on mean scores for the units mentioned above.

Table 24

Unit of Work Participant Scores by Nursing Role

Unit of Work Score by Nursing Role			
Unit of Work	As compared to Nursing Role	Mean	SD
ICU/ SDU	Direct Care	1.9823	.34839
(n = 65)	Front Line Leadership	2.0411	.26405
	Nursing Executive	2.8539	.37798
Emergency Department	Direct Care	2.0039	.26344
(n = 36)	Front Line Leadership	2.2740	.26739
	Nursing Executive	2.9726	*.31733
OB/ GYN/ NICU	Direct Care	2.0959	.33517
(n = 24)	Front Line Leadership	2.5014	.12044
	Nursing Executive	2.3836	.39915

Support - QI / Education/ Case Management (n = 24)	Direct Care	1.9909	.28516
	Front Line Leadership	2.2624	.43760
	Nursing Executive	2.9932	.00969
Leadership (n = 32)	Front Line Leadership	2.3502	.41880
	Nursing Executive	2.6276	.27689

Abbreviations: ICU/SDU, Intensive Care Unit/Step down unit; OB/GYN/NICU, Obstetrics/ Gynecology/ Neonate Intensive Care; QI, Quality Improvement.
*Average standard deviation in use for groups less than 3

Four units of work areas had significant differences in mean scores in comparison to level of education. In the medical/surgical unit nurses with a doctorate degree had the highest mean score (3.0959) while nurses with a diploma had the lowest mean scores (1.8402) ($p = 0.003$). Doctorate nurses in the ICU/SDU area had the highest mean score (.3.0685) while nurses with an associate degree had the lowest score (1.9110) ($p = < 0.001$). In the emergency services area nurses with an MSN had the highest mean score (2.7466) while nurses with an associate degree had the lowest score (2.0068) ($p = 0.014$). MSN nurses also had the highest score (2.5251) in the ambulatory setting while diploma nurses had the lowest score (1.7945) ($p = 0.014$). Mean scores are displayed for these units on Table 25, Unit of Work Participant Scores by Level of Education.

Table 25

Unit of Work Participant Scores by Level of Education

Unit of Work Participant Scores by Level of Education			
Unit of Work	As compared to Level of Education	Mean	SD
Medical Surgical	Diploma	1.8402	.09324
(n = 93)	Associate	2.0466	.31245
	Bachelor	2.1112	.30194
	MS/MSN	2.3213	.37617
	Master's other	2.4247	*.33440
	Doctorate	3.0959	.33441
ICU / NICU / SDU	Associate	1.9110	.27752
(n = 65)	Bachelor	1.9951	.34935
	MS/MSN	2.3927	.14648
	Master's other	2.2055	*.38035
	Doctorate	3.0685	.09686
Emergency Department	Diploma	2.2063	*.31734
(n =36)	Associate	2.0068	.42388
	Bachelor	2.0446	.24317
	MS/MSN	2.7466	.31965
Abbreviations: ICU, Intensive Care Unit; NICU, Neonate Intensive Care; SDU, Step down unit. *Average standard deviation in use for groups less than 3			

Nurses with certification in the medical surgical unit had significantly higher mean scores (2.23) than nurses without certification (2.08) ($p = 0.038$). Similarly ICU/SDU certified nurse had significantly higher scores (2.1134) than non-certified nurses in that unit (1.90) ($p = 0.027$).

Five separate units had significant differences in mean score when compared to previous QI training. In each unit, nurses with previous QI training scored higher than those without QI training. These units include medical/surgical areas ($p = 0.002$), ICU/SDU areas ($p = 0.013$),

perioperative areas (p = 0.006), ambulatory areas (p = 0.017), and leadership areas (p = 0.001). Of note, in every area within the acute care setting, nurses with previous QI training scored higher than those without. Other areas that had scores that would warrant more attention include the support areas (p = 0 .054) and the subset specialty areas Pediatrics/Rehab/Psychiatric (p = 0.070). See further results in Table 26, Unit of Work Participant Scores by Previous QI Training and Appendix GG, Unit of Work - QUISKA2 for data regarding comparisons with other independent variables.

Table 26,

Unit of Work Participant Scores by Previous QI Training

Unit of Work Participant Scores by Previous QI Training					
Unit of Work	Previous QI training	Mean	SD	N	Sig
Medical Surgical	Yes	2.2523	0.3423	38	
	No	2.0351	0.301	55	0.002
ICU/ SDU	Yes	2.1562	0.44558	30	
	No	1.9249	0.27848	35	0.013
Perioperative	Yes	2.3093	0.28922	26	
	No	2.0467	0.34837	22	0.006
Ambulatory	Yes	2.274	0.43921	14	
	No	1.8658	0.27449	10	0.017
Support	Yes	2.4283	0.5106	15	
	No	2.0578	0.23961	9	0.054
Leadership	Yes	2.6164	0.29718	23	
	No	2.1629	0.37462	9	0.001
Abbreviations: ICU, Intensive Care Unit; SDU, Step down unit.					

Unit of Work - Knowledge Subset. The scores from the 17 questions within the knowledge subset were used to compare the unit of work areas of specialty with the variables of facility, nursing role, level of education, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the nine units of work or areas of specialty in the knowledge subset (p = 0 .019). Sample size may not have been sufficient to show unit to unit statistical significant with analysis over nine separate units. Nurses who reported that they worked in the leadership area of specialty, had significantly higher scores In unit of work - knowledge subset nurses in the role of front line leader in the leader area of work had significantly higher mean scores (.8125) than nurses in the role of nurse executive (.7463) (p = 0.027). See Table 27, Unit of Work - Knowledge Scores, and Appendix HH, Unit of Work - Knowledge Subset for all other comparison data.

Table 27

Unit of Work - Knowledge Scores

Unit of Work - Knowledge Scores			
Unit of Work	Mean	SD	N
Medical Surgical	.7147	.11306	93
ICU/ SDU	.7204	.10190	65
Perioperative Areas	.7402	.08985	48
Emergency Care	.7108	.11456	36
OB/GYN/NICU	.7157	.11330	24
Pediatrics/Rehab/ Psychiatry	.7000	.12205	20
Ambulatory	.7059	.08319	24
Support	.7745	.10925	24
Leadership	.7794	.08583	32

Abbreviations: ICU, Intensive Care Unit; SDU, Step down unit; OB, Obstetrics, GYN, Gynecology, NICU, Neonatal Intensive Care Unit

Unit of Work - Skills Critical Thinking Subset. The scores from the 15 questions within the skills critical thinking subset were used to compare the unit of work with the variables of facility, nursing role, level of education, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the nine units of work or areas of specialty in the skills critical thinking subset (p = 0 .023). See Table 28 Unit of Work - Skills Critical Thinking Scores.

Table 28

Unit of Work - Skills Critical Thinking Scores

Unit of Work - Critical Thinking Scores			
Unit of Work	Mean	SD	N
Medical Surgical	.7814	.14658	93
ICU/ SDU	.7846	.13782	65
Perioperative Areas	.8097	.10740	48
Emergency Care	.7981	.17200	36
OB/GYN/NICU	.7944	.11279	24
Pediatrics/Rehab/ Psychiatry	.7567	.12288	20
Ambulatory	.7583	.18527	24
Support	.8250	.10912	24
Leadership	.8792	.11160	32

Abbreviations: ICU, Intensive Care Unit; SDU, Step down unit; OB, Obstetrics, GYN, Gynecology, NICU, Neonatal Intensive Care Unit

Nurses who reported that they worked in the leadership area of specialty, had significantly higher scores than nurses in all other areas except for support services. See Table 29, Unit of Work - Leadership - Skills Critical Thinking Comparison for further details.

Table 29

Unit of Work - Leadership - Skills Critical Thinking Comparison

Unit of Work -Leadership- Skills Critical Thinking Comparison						
					95% Confidence Interval	
Unit of Work (A)	As Compared to (B)	Mean Difference (A-B)	Std. Error	Sig.	Lower Bound	Upper Bound
Leadership	Medical Surgical	.0978*	.02828	.022	.0067	.1889
	ICU/ SDU	.0946	.02980	.059	-.0015	.1906
	Perioperative Areas	.0694	.03149	1.000	-.0320	.1709
	Emergency Care	.0810	.03353	.582	-.0270	.1891
	OB/GYN/NICU	.0847	.03726	.849	-.0354	.2048
	Pediatrics/Rehab/ Psychiatry	.1225	.03934	.072	-.0043	.2493
	Ambulatory	.1208*	.03726	.047	.0008	.2409
	Support	.0542	.03726	1.000	-.0659	.1742

Abbreviations: ICU, Intensive Care Unit; SDU, Step down unit; OB, Obstetrics, GYN, Gynecology, NICU, Neonatal Intensive Care Unit Based on observed means. The error term is Mean Square(Error) = .019. *. The mean difference is significant at the .05 level.

In unit of work - skills critical thinking subset direct care nurses in the ICU/SDU had lower scores than nurse executives from the ICU/SDU (p = 0.017, *CI* = -0.4041, - 0.0207). Nurses with a doctorate degree in the ICU/SDU had higher scores (1.000) than nurses with an associate degree in the same unit (.7000) (p = 0.008). MSN nurses in the OB/GYN/NICU area had higher scores than associate degree nurses (p = 0.019, *CI* = 0.0274, 0.3578). ICU/SDU nurses with six to ten years of nursing school had higher mean scores than ICU/SDU nurses with >20 years of nursing school (p = 0.011, *CI* = 0.0226, 0.2567). ICU/SDU nurses with prior QI training had higher mean scores (.8311) than ICU/SDU nurses without prior QI training (0.7448)

(p = 0.011). Also of note is that support service nurses with prior QI training had higher mean scores (0.8578) than support service nurses without prior QI training (0.7704) (p = 0.055). See Appendix II, Unit of Work - Skills Critical Thinking Subset for all other comparison data.

Unit of Work - Proficiency/ Frequency Subset. The scores from the 30 questions within the skills proficiency/frequency subset were used to compare the unit of work with the variables of facility, nursing role, level of education, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the nine units of work or areas of specialty in the skills proficiency/frequency subset (p = < 0 .001). See Table 30, Unit of Work - Skills Critical Thinking Scores.

Table 30

Unit of Work - Skills Critical Thinking Scores

Unit of Work - Skills Proficiency Scores			
Unit of Work	Mean	SD	N
Medical Surgical	2.9896	.71683	93
ICU/ SDU	2.7933	.85170	65
Perioperative Areas	3.0986	.78282	48
Emergency Care	2.9204	.76221	36
OB/GYN/NICU	3.1972	.81406	24
Pediatrics/Rehab/ Psychiatry	3.1050	.84274	20
Ambulatory	2.9306	1.00217	24
Support	3.2889	1.05577	24
Leadership	3.7438	.90413	32

Abbreviations: ICU, Intensive Care Unit; SDU, Step down unit; OB, Obstetrics, GYN, Gynecology, NICU, Neonatal Intensive Care Unit

Nurses who reported that they worked in the leadership area of specialty, had significantly higher scores in most areas of specialty except OB/GYN/NICU, Pediatrics/Rehab/ Psychiatry and support areas. See Table 31, Unit of Work - Leadership - Skills Proficiency/ Frequency Comparison for further details.

Table 31

Unit of Work - Leadership - Skills Proficiency/ Frequency Comparison

Unit of Work -Leadership- Skills Proficiency/ Frequency Comparison						
Unit of Work (A)	As Compared to (B)	Mean Difference (A-B)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Leadership	Medical Surgical	.7541*	.17000	.000	.2063	1.3019
	ICU/ SDU	.9504*	.17913	.000	.3732	1.5276
	Perioperative Areas	.6451*	.18931	.026	.0351	1.2551
	Emergency Care	.8234*	.20154	.002	.1740	1.4728
	OB/GYN/NICU	.5465	.22399	.546	-.1752	1.2683
	Pediatrics/Rehab/ Psychiatry	.6388	.23645	.260	-.1231	1.4006
	Ambulatory	.8132*	.22399	.012	.0914	1.5350
	Support	.4549	.22399	1.000	-.2669	1.1766

Abbreviations: ICU, Intensive Care Unit; SDU, Step down unit; OB, Obstetrics, GYN, Gynecology, NICU, Neonatal Intensive Care Unit Based on observed means. The error term is Mean Square(Error) = .019. *. The mean difference is significant at the .05 level.

In unit of work - skills proficiency frequency subset nurse executive nurses in the ICU/SDU had significantly higher scores than direct care nurses ($p = 0.001$, $CI = 0.7004$, 2.9547) or front line leaders in the ICU/SDU ($p = 0.002$, $CI = 0.5571$, 3.0563). Direct care nurses in the support areas had higher mean scores than nurse executives ($p = 0.040$, $CI = 0.0804$,

4.5604). Nurse executives in the ambulatory setting had higher mean scores (4.900) than direct care nurses (2.7381) (p = 0.002). Nurse executives in the leadership grouping also had higher mean scores in proficiency and frequency (4.0813) than front line leaders (3.4063) (p = 0.032).

Nurses with doctorate degrees had significantly higher skill proficiency/frequency mean scores (5.3000) while diploma nurses had the lowest mean scores (2.2889) in the medical surgical areas (p = .001). In the ICU/SDU area associate degree nurses had the lowest level of proficiency frequency mean scores (2.5786) while doctorate degree nurses had the highest (5.0333) (p = .001). MSN nurses in the emergency care areas had the highest proficiency/ frequency mean scores (4.4333) and associate degree nurses had the lowest mean scores (2.7556) (p = 0.022). Similarly, MSN nurses in the ambulatory setting had the highest proficiency/ frequency mean scores (3.8889) while diploma nurses had the lowest mean scores (2.4667) (p = 0.018). Certified nurses in the medical surgical areas and the ICU/SDU had higher mean scores respectively (3.2619) and (2.9658) than non-certified nurses (2.8723), (2.5 173) with significance of (p = 0.0015) for medical surgical and (p = 0.0038) for ICU/SDU. Every unit or work showed higher mean scores for nurses with prior QI training. Table 32, Unit of Work-Skills Proficiency/Frequency - Prior QI Training lists mean scores for each unit of work and the level of significance in the differences of mean scores.

Table 32,

Unit of Work-Skills Proficiency/Frequency - Prior QI Training

Unit of Work - Skills Proficiency/Frequency					
Unit of Work	Prior QI Training	Mean	SD	N	Sig
Medical Surgical *	Yes	3.3009	.71683	38	< .001
	No	2.7745	.63880	55	
ICU/NICU/SDU *	Yes	3.0578	.99770	30	0.019
	No	2.5667	.63390	35	
Perioperative *	Yes	3.3667	.68534	26	0.008
	No	2.7818	.78631	22	
Emergency Care	Yes	3.0262	.50893	14	0.514
	No	2.8530	.89204	22	
OB/GYN	Yes	3.4024	.91320	14	0.148
	No	2.9100	.57608	10	
Pediatrics/ Rehab/ Psychiatric *	Yes	3.3769	.80143	13	0.046
	No	2.6000	.71181	7	
Ambulatory *	Yes	3.3619	1.01138	14	0.009
	No	2.3267	.62811	10	
Support - QI/ Education/ CM	Yes	3.5800	1.19016	15	0.081
	No	2.8037	.54961	9	
Leadership *	Yes	4.0623	.70290	23	0.001
	No	2.9296	.87836	9	

Abbreviations: ICU, Intensive Care Unit; NICU, Neonate Intensive Care; SDU, Step down unit; OB/GYN, Obstetrics/ Gynecology; QI, Quality Improvement; CM, Case Management.
*. The mean difference is significant at the .05 level

In addition, Appendix JJ, Unit of Work - Skills Proficiency/Frequent Subset lists other data relevant to comparison of work group information to each variable.

Unit of Work - Attitude Subset. The scores from the 11 questions within the attitude subset were used to compare the unit of work with the variables of facility, nursing role, level of education, certification, years from nursing school and previous QI training. A general linear regression (GLR) for the independent variable of nursing role and the dependent variable of the knowledge subset was run with an alpha of .05. Post hoc analysis was completed using Bonferroni. Statistical significance was noted between the nine units of work or areas of specialty in the attitude subset (p = 0 .013). See Table 33, Unit of Work - Attitude Scores.

Table 33

Unit of Work - Attitude Scores

Unit of Work - Attitude Scores			
Unit of Work	Mean	SD	N
Medical Surgical	3.7713	.46560	93
ICU/ SDU	3.6811	.39106	65
Perioperative Areas	3.8277	.19420	48
Emergency Care	3.6742	.31219	36
OB/GYN/NICU	3.7992	.16950	24
Pediatrics/Rehab/ Psychiatry	3.8364	.21187	20
Ambulatory	3.8447	.14306	24
Support	3.9015	.18940	24
Leadership	3.9034	.21898	32

Abbreviations: ICU, Intensive Care Unit; SDU, Step down unit; OB, Obstetrics, GYN, Gynecology, NICU, Neonatal Intensive Care Unit

In the unit of work- attitude subset (n =11), nurses who were in the leadership group with an associate degree has lower attitude scores than BSN nurses (p = 0.008, CI = -0.9891, -.1018),

MSN nurses (p = 0.018, *CI* = -0.9403, -.0597), and nurses who had a Master's degree other than nursing (p = 0.010, *CI* = -1.0112, -.0927). Nurses in the perioperative area with previous QI training had higher mean attitude scores (3.8986) than those without previous QI training (3.7438) (p = 0.005). Nurses in the OB/GYN/NICU area with previous QI training also had higher mean attitude scores (3.8638) than those without the training (3.7091) (p = 0.024). Appendix KK, Unit of Work Attitude Subset contains all other scores.

Additional Findings

One of the demographic variables added to the QUISKA2 descriptive survey study was national certification. National certification is typically not a requirement of employment for most registered nurses within the acute care setting, however, it is highly recommended. In the QSAAN study half of the nurses reported national certification. Those with certification had significantly higher mean scores than those without certification (p = 0.015, *CL* = 2.156, 2.266). See Table 34, QUISKA2 Certification Scores.

Table 34

QUISKA2 Certification Scores

QUISKA2 Certification Scores							
Certification	Mean	SD	*n*	Min	Max	Skew	Kurtosis
Yes	2.2108	0.3956	183	1.37	3.14	0.248	-0.606
No	2.1136	0.3609	183	1.07	3.12	0.132	0.130

Two other variables evaluated within the context of other indicators were prior QI training and years from nursing school. When analyzed as a single variable to the QUISKA2, participants who had previous QI training had significantly higher scores than those who did not

($p < 0.001$, $CL = 2.253, 2.354$). See Table 35, QUISKA2 Prior QI Training Scores. QI training also demonstrated a significant relationship ($p < 0.001$) to years from nursing school. There was a significant difference between years from nursing school and nurses who had previous QI training ($p < 0.001$). Nurses who had nursing education in the last five years were more likely to have had QI training (see Table 36, Prior QI Training and Years from Nursing School and Appendix LL, Prior QI Training Comparison to Years from Nursing School).

Table 35

QUISKA2 Prior QI Training Scores

QUISKA2 Prior QI Training Scores							
Prior QI Training	Mean	SD	*n*	Min	Max	Skew	Kurtosis
Yes	2.3035	0.3907	187	1.08	3.14	-0.123	-0.173
No	2.1622	0.3812	179	1.07	2.97	0.284	0.053

Table 36

Prior QI Training and Years from Nursing School

Prior QI Training and Years from Nursing School			
Years from Nursing School	Mean	SD	N
<2 years	1.75	.447	16
2-5 years	1.78	.422	49
6-10 years	1.60	.494	60
11-20 years	1.53	.503	74
>20 years	1.32	.469	167
Scale: 0 = no QI training, 1 = QI training			

Discussion

The QSAAN descriptive survey study was an effective measurement of the knowledge, skills and attitudes of practicing nurses in the acute care setting. The participants of the study were representative of the general population of nurses in the acute care setting within the demographics of age, gender, nursing role and unit of work. The participant pool was noted to have a 10.7% higher BSN or higher degree and a 24% higher certification rate than the general nursing population at the designated research sites. This more highly educated participant group may have resulted in participant scores higher than the actual population and may limit the generalizability of these results to the entire population. The group of nurses in the convenience sample was representative of the final participant group.

Reliability and Validity of QUISKA2

Findings from this study offer a broad analysis on the use of the QUISKA2 tool to evaluate the current acute care practicing nurses' knowledge, skills, and attitudes related to the QSEN domains. The QUISKA2 tool is unique in that it measures each of the three subsets of knowledge, skills, and attitude along with the six QSEN domains. Combining this attribute within one tool is an efficient and effective measurement strategy and supports a professional practice environment that bases decisions on evidence and value based organizational effectiveness (Porter-O'Grady & Malloch, 2007).

Previous tools have demonstrated the ability to measure a single domain such as safety knowledge within the academic setting for medical residents (Madigosky, Headrick, Nelson, Cox & Anderson, 2006) or nursing students (Chenot & Daniel, 2010). There have been only two tools developed to evaluate all six of the QSEN domains as a whole. The first of these was the QSEN

Student Evaluation Survey (SES) used on nursing students from 17 United States schools of nursing (Sullivan, Hirst & Cronenwett, 2009). The second tool was the precursor to the QUISKA2 and was instead called Quality Improvement Knowledge, Skills and Attitude (QuISKA) used in the pediatric oncology nurse population (Dycus & McKeon, 2009). The challenge that each of these studies faced was development of a tool to adequately measure the knowledge, skills, and attitudes of each of the six QSEN domains, yet, not become prohibitive in length. The QSAAN study faced this similar challenge.

The QUISKA2 was a lengthy survey with 73 content questions and an additional eight questions in the demographics section. The time to completion was estimated to be between 15 to 30 minutes per participant based on time to complete by the convenience sample and completion time from the first research study (Dycus and McKeon, 2009). The average time to complete the QUISKA2 survey was 25.9 ± 11.5 minutes which proved to be nearly identical to the first study (27.9 9 ± 15.7 minutes). Participants were given the average time to completion estimate prior to the survey; however, having a block of time of this length to complete the entire survey was a barrier for many practicing nurses. The participation rate was strong with 668 nurses or 32.4% of all eligible nurses initiating the survey, however, only 55% of those who started completed the entire survey. The factors that contributed to the low completion rate included participant fatigue and the length and time involved. One recommendation for future studies would be to assess the order of questions within the survey. The first several questions proved to be difficult with low percentage of correct answers. It would be recommended to start the survey with questions that are more familiar to the practicing nurse, such as those that relate to Teamwork and Collaboration or Patient Centered Care. This design may enable the

participants to gain greater confidence in their ability to answer questions and promote willingness to complete the survey. The placement of the Likert-type questions at the end of the survey is an effective methodology as these questions are quicker to answer and help mitigate participant fatigue.

The goal for number of completed surveys was 365based on an apriori sample size calculation for completion of factor analysis. A large pool of registered nurses was used to strengthen the chance for achieving the targeted participation goals and proved successful with 366 completed surveys. The use of site champions and support of facility CNOs was an effective strategy to achieve sufficient participation.

Responses to Research Questions

The first research question was; is the QUISKA2 a valid and reliable tool for use within the acute care practicing nurse setting was answered affirmatively. The QUISKA2 overall inter-item correlation coefficient was high (.94), suggesting the tool is a reliable instrument to measure knowledge, skills, and attitudes of practicing nurses in the acute care setting related to the six QSEN domains. In-depth analysis of questions within the knowledge, skills, and attitudes subsets had inter-item correlation coefficients of .61 for knowledge and skills and .91 for attitude indicating that even separately these questions reliably measured the knowledge, skills, or attitudes of the QSEN subsets. The Factor Analysis confirmed the differences between various domains within QSEN and variation in applicability of concepts of quality improvement and evidence based practice concepts.

Specific recommendations for the QUISKA2 address questions within two of the subsets. Three questions (4%) identified within the knowledge section had less than a 5% variability

indicating the need to review and possibly revise these questions prior to further dissemination. The current bundling of proficiency/frequency skills questions related to use of charts and graphs might be better representative of participant's knowledge level if placed in the context of interpreting displays or in a format of interpreting research examples by using critical thinking. However, the knowledge gained by understanding the frequency of utilization of basic and advance QI and EBP tools is beneficial in providing feedback to the facilities for identified gaps in proficiency, and also for providing feedback to academia related to actual practice expectation of these skills for practicing nurses.

The QUISKA2 proved to be a reliable tool for all levels of nursing roles within the acute care setting. This answered the second research question which asked is the QUISKA2 tool valid and reliable for all levels of nurses within the acute care practice setting. The QUISKA2 had high inter-item correlation ratings for each of the nursing roles; direct care .93, front line leader .94, and nurse executive .94. When the QUISKA2 was separated into the subsets of knowledge, skills critical thinking, skills proficiency/frequency and attitude there were variations in inter-item ratings between the nursing roles, however each maintained significance at the $p < 0.001$ level.

Identification of QSEN Application to Acute Care Nurses

The third research question asked which of the QSEN domains had the highest and lowest familiarity, attitude, and proficiency/frequency skill level for participants. Knowing this answer is fundamental to developing education that will assist with applying QSEN competencies to the practice setting. One of the overarching goals of the QSAAN project was to improve the quality safety environment within the acute care setting. One of the first steps in

applying the results of this study was the identification of the current practicing nurse's knowledge of and ability to apply different QSEN competencies.

The QSEN domain of Patient Centered Care consistently had some of the highest scores with the subsets of knowledge, skills critical thinking, skills proficiency/ frequency, and attitude. Nurses reported they were most familiar with activities and questions related to involving patients in decision making and applying concepts of patient centered care into their daily work. This finding is consistent with the theoretical foundation which places primary emphasis on patient centered care as the pivotal point to providing quality and safety in nursing (Altmiller, 201; Cadmus, 2011; Pronovost & Vohr, 2010).

Teamwork and Collaboration was also an area that nurses reported high knowledge and skill. Nurses reported proficiency and greater frequency of being team leaders or members of a team versus having proficiency in team training; a finding that mirrors similar results to the first study by Dycus and McKeon (2009). Team training is an essential characteristic of high reliability practice such as that seen in the field of aviation or in the military (McKeon, Cunningham, Oswaks, 2008). Indeed, one of the characteristics of a highly reliable organization is the belief that safety is a shared accountability between the individuals performing the task (Riley, 2008; Sammer, et. al., 2010). The concept of teamwork and high reliability organizations is promoted at each of the participating facilities and within the hospital system of which each is a member. Thus, the recommendation for the facilities in this study would be to improve the teamwork and collaboration competency by providing educational interventions and support for formal team training.

Nurses had high levels of proficiency/frequency with Informatics and electronic medical records with the exception of Computerized Physician Order Entry (CPOE). Nurses also rated high proficiency in using informatics to monitor patient outcomes. However, nurses did not place as high of value of nursing involvement or participation in designing informatics systems. The facilities in this study have had an electronic medical record for several years with the exception of CPOE which will be initiated within the near future. The high scores support the integration of electronic medical records and electronic monitoring of patient outcomes as a daily activity for nurses in the acute care practice setting. These same results may not be found in acute care settings where electronic medical records are not as widely utilized.

Nurses understood the contributing factors and concepts of a safety environment; however, they did not recognize examples of a culture of safety nor acknowledge standardization of practice as an essential component of a safety culture. This finding highlights another opportunity for education and promotion for the facilities involved in the study. The overwhelming focus on safety is a reflection of a high reliability organization. Promoting a safety culture will improve patient care and make acute care hospitals safer (Pronovost & Vohr, 2010). Recommendations include the development of safety competencies that incorporate education around components of a safety culture and characteristics of highly reliable organizations.

The majority of the lowest scoring questions were in the QI domain, specifically around the identification of tools used in the QI process. One explanation to the lack of knowledge around QI processes could be related to the proficiency and frequency that nurses reported in the use of various QI tools. Nurses reported an average rating for QI skills as “understanding” with

the use of these concepts one or two times. Nurses stated they had QI skills and experience with error reporting systems, process mapping/ flow charts, Six Sigma or PDCA, collecting data for chart review and PIE charting. Nurses on the average stated they had familiarity, but had never used other QI process such as control charts, run charts, histograms, Pareto charts, root cause analysis or Failure Mode and Effects Analysis. Approximately half of the nurses stated they had previous QI training. The results of the QSAAN study are similar to results obtained by Dycus and McKeon (2009) which indicate that nurses in the practice setting understand basic QI concepts; however, nurses do not perform QI processes as part of the work. A clear distinction was evident however, that nurse who had previous QI training demonstrated significantly higher scores. It would be an expectation that greater knowledge and skills would translate to better quality and safety outcomes. Thus, the recommendation would be to improve the knowledge and skills of the workforce around the topic of QI. With the added training comes the experiential learning component of applying these concepts into practice. This may represent a financial barrier due to the fact that this recommendation would require organizations to allow nurses to have time away from direct patient care activities to learn and apply QI concepts.

Nursing academia has recognized the need for QI training and has incorporated this into the QSEN competencies (Barton, Armstrong, Preheim, Gelmon, & Andus 2009). The statistical difference in scores between nurses who had previous QI training and those who had not would support that integration of QI concepts is appropriate for nurses. However, there is a current disconnect between what new nurses learn in school regarding QI and QSEN competencies and what they find in the practice setting. Kovner, Brewer, Yingrengreung & Fairchild (2010) found that new nurses did not experience a connection with QI education received in school and their

work in the practice setting; rather, they felt responsibility to patient care but not for quality improvement. The QSAAN study demonstrated there are many nurses in the practice setting who have never received QI training. This was not a component of nursing education for the majority of nurses in the practice setting. If the application of QSEN competencies were to be applied to practicing nurses, QI training would be a necessary educational intervention. With this content now being taught in nursing school, the gap in knowledge related to QI is expected to decrease and should result in higher QI domain scoring with the QUISKA2. The QSAAN study results indicate there are greater numbers of nurses with QI training who have completed nursing education within the last five years. It is essential to establish a working environment where nurses can utilize the QI skills learned in nursing school once they enter the practice setting. Continued monitoring of QI training needs would be a recommendation for all new nurses who enter the practice setting.

The final domain of EBP had mixed scores of high knowledge around the conceptual model of EBP, locating and appraising literature and use of practice guidelines, but much lower scores levels in the application of EBP skills to assess research articles or understand more complex statistical analysis. This speaks to the introduction of EBP to the practice setting where most of the nurses had never had exposure to the concept in nursing school. The variability of scores indicate the need to teach nurses how to apply the concepts of EBP and the need to integrate this concept further into the practicing nurse setting.

The second outcome was to understand how each of the independent variables contributes to scores within the subsets of knowledge, skills, and attitudes within the QSEN

domains. This outcome was met with a clear delineation to focus continuing education on team training, CPOE, elements of a safety culture, QI process and integration of EBP into practice.

Level of Nursing Roles

The fourth and fifth research question were, does the nursing role impact the scores for knowledge, skills, and attitudes, and at what point in the leadership continuum do practicing nurses start to utilize and/or understand some of the higher level skills as addressed in QSEN domains? Leadership role does impact the knowledge, skills (proficiency/frequency) and attitudes related to the QSEN domains ($p < 0.001$). Each progressive role in the leadership continuum scored higher; for example, front line leaders scored higher than direct care nurses, while nurse executives scored higher than front line leaders. There is a relationship to nursing role and knowledge, skills and attitudes; direct care nurses were significantly lower to the other two leadership roles in all subsets. Front line leaders however, were only significantly lower in one subset, the skills proficiency/frequency subset, when compared with the nurse executives group. This would lead to the finding that front line leaders have similar knowledge and attitudes to nurse executives, but do not have the proficiency or frequency of performing advanced level QI and EBP competencies.

Each level of nursing role was compared to the other variables to assess for relationships and performance. Within the direct care nursing role, nurses with an associate degree reported less knowledge or proficiency than nurses with BSN and MSN in the knowledge and skills critical thinking subsets. Similarly nurses with a MSN reported higher skills proficiency/ frequency than nurses with lower academic degrees. Front line leaders with a MSN also reported greater proficiency with skills than diploma or associate degree nurses. In the nurse executive

level, doctorate degree nurses reported higher proficiency of skills than nurse executives with BSN degrees. This supports the finding that even within the various roles of nursing in the practice setting, level of education impacts the perception and application of quality safety competencies within the QSEN domains.

Other findings within the nursing roles subset was that direct care nurses and front line leaders with previous QI training reported significantly higher scores in different subsets than those who have not had QI training. This would warrant evaluation of insertion of QI training into orientation and competency requirements for these nursing roles. This finding supports the inclusion of quality safety into nursing curriculum and to have nurses prepared to perform these functions as part of their work (Sullivan, Hirst & Cronenwett, 2009). The ability to have nurses educated in these concepts will provide for a workforce better prepared in quality and safety competencies.

There was a difference noted between nursing roles within the subset of attitude. The differences in scores depended upon the nursing role and work setting for front line leaders and nurse executives. Front line leaders in support services such as quality, safety, Case Management and nursing education rated items as higher importance (attitude scores) than similar nurses who worked in the emergency areas. This finding could reflect a difference of job responsibilities and attention to quality improvement as a role and accountability for work. For example, patients in the emergency room require care for brief periods of time. Emergency room leaders would not have the same level of attention on quality improvement initiatives that focus on issues more commonly found in patients with extended length of stay. Hospital acquired conditions such as

pressure ulcers, or catheter associated urinary tract infections are major initiatives within the acute care setting, however, these generally do not apply to the emergency care areas.

Nurse executives also reported different levels of importance based on location with ICU/SDU nurse executives reporting higher importance scores than medical/surgical leaders. This can also be attributed to the exacting focus on outcomes in the ICU areas of the hospital. These areas have the highest acuity patients with the highest opportunity for adverse events. The nursing leaders are thus more aware of monitoring additional outcomes that may coincide with the higher cost and occurrence of adverse events.

Direct care nurses rated themselves more skilled than front line leaders in the proficiency/ frequency subset in two Patient Centered Care competencies; patient centered care and integrating cultural and religious values into the patient's plan of care. This is expected as this is a skill more often performed as a required job function of a direct care nurse. Nurse executives however, reported higher proficiency and frequency with these same Patient Centered Care skills than either the direct care nurse or the front line leader. This higher proficiency would not reflect current performance, but might instead reflect greater confidence and or experience with these topics over the course of their career. Direct care nurses also reported higher proficiency than nurse executives with electronic medical records and with both groups with CPOE. This reflects the job duties in integrating informatics and the electronic medical records into daily work. The introduction of electronic medical records is a relatively new skill, one that many nursing leaders have not experienced within their career. Thus, it was direct care nurses who reported the highest level of proficiency and skills with this informatics technology.

The largest gaps in the nursing roles came in reported proficiency and frequency in QI processes and EBP application. Direct care nurses reported that they understand and have performed literature searches for EBP and have integrated EBP into practice, have collected data for chart reviews, and participated in error reporting systems and flowcharting. Front line leaders rate those same items at that level or higher (chart reviews and integrating EBP), and in addition reported a rating of understanding PIE charts, simple statistical analysis, critical appraisals of research studies and root cause analysis. Nurse executives reported that they have higher levels of proficiency in all of those categories and report a skilled to proficient rating for all of the QI and EBP competencies with the exception of familiar ratings for more complex statistical analysis of EBP or research of t-tests, Chi square, ANOVA and Regression Analysis. Each level of nursing role gains knowledge and skills to perform increasingly more complex and varied QI and EBP process and applications. Teaching these concepts to practicing nurses should account for the nursing role and the applicability to the work setting. Experiential learning will facilitate greater confidence with these QI and EBP processes.

Levels of Education

The sixth and seventh research questions were; is there a difference between levels of education and the knowledge, skills, and attitudes of current practicing nurses, and is there a difference in level of education and knowledge, skills, and attitudes related to the three levels of nursing roles? There was a significant difference in scores with the levels of education for nurses. The higher the academic preparation, the higher the participant scores in most situations. BSN prepared nurses had significantly higher knowledge and skills with the QSEN competencies than associate degree nurses. BSN nurses also performed statistically better when in the front

line leader role than they do at the direct care nurse role. This finding supports previous research that suggest BSN prepared nurses perform better on topics of QI, Safety and EBP (Kovner, Brewer, Yingrengreung, & Fairchild, 2010). MSN degree nurses also reported significantly higher scores in knowledge and skills compared to BSN, and associate degree nurses. Of note, it did not matter how long the time was from the nursing degree, MSN nurses still reported higher scores. This finding suggests that nurses in all roles within the acute care practice setting should pursue higher academic degrees. The QSAAN survey also found that doctorally prepared nurse outperformed all other levels of education, most notably in the skills proficiency and frequency subset. This performance would be expected for the doctorate level of education.

While level of education was reported as a demographic data point in the first study (Dycus and McKeon, 2009), there was no report of relation of level of education to participant scores, thus no comparison can be made between the studies. The subset that had the greatest difference between the level of education and participant scores was the skills proficiency/ frequency subset. This would suggest that there is great variability in how these identified skills are utilized or supported in the acute care setting. These skills competencies also represent the application of QI and EBP concepts. The QSAAN study suggests that these higher levels QI and EBP skills are utilized after a nurse achieves a graduate degree. Thus, the QSAAN study supports the recommendation that a highly educated workforce is better prepared to integrate EBP and quality safety competencies as recommended from the Institute of Medicine (2003). Having nurses equipped with the knowledge and skills to perform these higher levels QI and EBP skills should then result in better patient outcomes (IOM, 2003; Bisognano, 2010).

There was a significant relationship found between level of education and previous QI training at the associate, BSN and MSN levels. It was not unexpected to find that all participating nurses with a doctorate degree reported previous QI training. This would suggest that having at least a BSN degree paired with QI training results in a staff with greater potential to perform quality and safety.

Unit of Work

The final research question, does the unit of work have an impact upon the acute care practicing nurses' scores for knowledge, skills, and attitudes related to the QSEN domains was answered by finding significant differences in specific areas or units of work in the acute care setting. As an overall tool, the QUISKA2 demonstrated significance (p <0.001) with nurses in leadership reporting higher scores than medical/surgical, ICU/SDU, perioperative areas, emergency care areas, and ambulatory care areas. This would be an expected outcome for those in formal leadership to have higher familiarity with quality safety concepts. The majority of the variation between nursing roles was accounted for in the skills proficiency/frequency subset where there was a 25% variation in scores based on unit of work.

When unit of work was compared with the three levels of nursing roles, five different areas again had significance between units and nursing roles within those units. The role that the nurse has in the ICU/SDU, emergency care areas, OB/GYN/NICU, support services and within leadership appears to make a difference on reported levels of knowledge, and skills, and attitudes. As found in the nursing role analysis, the higher the nurse role, the higher the scores.

In addition, the level of education within specific nursing units also impacted mean scores and showed significance in medical surgical units (p = 0.003), ICU/SDU (p = < 0.001),

emergency care areas ($p = 0.014$) and ambulatory care areas ($p = 0.014$). As noted in the discussion on levels of nursing, a higher academic degree results in higher reported scores in the QUISKA2 tool. This was most evident in these four units. This would then suggest, that to obtain the highest knowledge and skills critical thinking and proficiency in these units, nursing leaders would seek out nurses with higher nursing academic degrees and promote further nursing education for current nurses.

Another significant finding was that medical surgical and ICU/SDU nurses who had certification reported higher scores. This finding supports other research that has found an association between lower patient mortality and failure to rescue with nurses with a BSN or higher degree with specialty certification (Kendall-Gallagher, Aiken, Sloane, & Cimiotti, 2011). If certified nurses have higher knowledge and skills and attitudes around quality and safety, it would follow that they would also result in better patient outcomes.

Unit of work and previous QI training demonstrated differences in how well nurses reported knowledge and skills. The units that demonstrated this difference included medical surgical, ICU/SDU, perioperative areas, ambulatory areas and leadership. With QI training a significant finding for unit of work, level of education and nursing role, it would be appropriate to evaluate the results of this survey to identify areas of lowest performance. Another consideration would be to assess those proficiency skills that are part of the routine day to day functions of nurses in the practice setting and emphasize the quality safety core curriculum in those areas. To mirror recommendations of the IOM (2003), educational interventions would focus on building teamwork and expanding the integration of EBP into the practice setting. These topics have already been identified as both high scoring topics and low scoring topics in

the QSAAN study. This finding would suggest that these concepts have been effectively introduced into the practice setting; however there is an identified need to enable application of these concepts into the work environment. This application to practice can take the form of competency demonstration of quality safety competencies for the practicing nurse.

Limitations

This project is a replicative study and as such is expected to align with similar methodology as the initial study by Dycus & McKeon (2009). While the original QuISKA tool had a report of inter-item correlation coefficient of 0.839, the QuISKA tool was used for only one particular population of practicing nurses, pediatric oncology registered nurses. Translation of the original tool to the greater acute care setting had not occurred.

The QUISKA2 tool has been revised and was intended to apply to all nurses within the acute care setting. This then required that new validation and reliability of the tool be established. A limitation to this process was that while this tool has many similarities, the tool itself was different from the original QuISKA tool. There was no correlation of individual questions to KSA subsets and QSEN domains from the original research. This resulted in new classification of questions into the Knowledge Skills, and Attitude subsets and QSEN domains. This limits the ability to compare results between the two studies. Another limitation to comparison between the two studies is different approaches to categorizing and analyzing questions within the skills subset. In the QSAAN study, skills were divided according to scale that applied to the questions creating a skills critical thinking subset and a skills proficiency/ frequency subset.

Another limitation was the use of participants from four urban hospitals from a single state-wide healthcare system. This may limit the generalizability of these findings to other types of acute care facilities. The intent of the project was to utilize nursing staff from more than one facility and more than one hospital sub-group within the healthcare system. The rationale for choosing two groups within the healthcare system was to garner a better mix of nursing staff. The healthcare system is composed of three groups of healthcare facilities, designated due to physical location within the state. The two groups chosen have different adjunct sponsorship, Adventist Health System and Catholic Health Initiatives. While they are both non-profit, faith-based organization, having the different sponsorship will support a less homogenous group than just utilizing one group. The project timeline prohibited expanding this study outside of the four selected facilities within one healthcare system.

Another limitation would be the sample size for the nurse executive nursing role. The actual number of nurses in these roles is small in comparison to direct care nurses or front line leaders. The number of actual participants in this role was representative of the overall nursing population for the nurse executive role. In order to gain a large sample size for this nursing role, a large number of hospitals would need to be included in the survey to account for the few nurses that qualify for this nursing role.

The length of the survey instrument was another limitation to this study. The participant start to completion rate of less than 60% warrants attention to the length of the survey. The actual completion time averaged just less than 30 minutes, however, this amount of time may be prohibitive. The survey was designed to allow for completion in more than one sitting if needed. It was not possible to assess if this functionality was used.

Recommendations

The QUISKA2 tool is a valid and reliable tool to measure the knowledge, skills, and attitudes of QSEN competencies of the three levels of nurses within the acute care practice setting. The tool can identify the role and level of education of nurses using complex quality improvement strategies and applying evidence based practice and research. This is important because quality safety competencies can then be established specific to the role in which the nurse practices. Additionally, utilization of a tool to measure the knowledge of the nursing workforce is an efficient and effective first step in establishing a baseline plan for improvement of the quality safety environment. Identifying the gaps in knowledge, skills, and attitudes allows for the development of focused educational interventions on topics within the QSEN domains. Obtaining this assessment was the first step of the QSAAN process; the next step will be to establish standardized competencies, or the application of quality and safety for practicing nurses. Using the QSEN competencies as a starting point provided synergy within the nursing profession. QSEN represents current evidence based practice for the education of nursing students while QSAAN is the assessment of the knowledge, skills, and attitudes of practicing nurses related to the identified competencies within the QSEN domains.

The QSAAN descriptive survey study found practicing nurses reported lowest proficiency in quality improvement and application of higher levels of evidenced-based practice and research processes. These topics were not a component of nursing curriculum when the majority of these nurses completed their nursing education. The QSAAN descriptive survey study did show that nurses who have completed a Master of Science in Nursing degree have greater knowledge and skills related to the QSEN competencies. BSN degree nurses also

reported greater knowledge within the direct care nurses role. Level of education does contribute to proficiency and knowledge of quality safety strategies. The more advanced the academic preparation, the greater the participant scored in most situations. Certified participants scored significantly higher as well. A highly reliable organization would support the professional development of nursing staff because academic preparation and certification is significant to the knowledge and proficiency of its nurses.

The theoretical foundation for QSAAN is centered in the provision of patient centered care built on a foundation of evidenced-based practice. Practicing nurses in the acute care setting consistently had highest knowledge, skills, and importance (attitudes) scores for the QSEN domains of Patient Centered Care and Teamwork and Collaboration. The competencies within these domains are ingrained in each nursing role throughout the acute care setting and serve as the foundation for building practicing nurses' quality safety competencies. The theoretical conceptual model also highlighted the need to consider nursing intellectual capital as the ability to promote an environment of quality and safety through a group knowledge conceptual framework. This is where the concept of teamwork and team training in safety are essential. The QSAAN descriptive survey study found that nurses felt well versed in teamwork and being on teams, but lacked team training education. Providing team training as a proactive approach to improving safety is a recommendation of this study. Further research will be needed to assess if team training is a gap that is generalizable to other acute care settings.

Only half of the nurses reported previous QI training and those without the training had significantly lower scores in knowledge, proficiency (skills), and attitudes of the QSEN competencies. Having prior QI training resulted in significantly higher scores for groups within

various nursing roles, levels of education and within different areas of specialty or units within the acute care setting. This finding suggests that QI training is a missing competency within the practice setting. Thus, a second recommendation from the QSAAN study is the need for QI training for all levels of nurses within the acute care setting.

The healthcare facility and nursing leaders have an accountability to establish systems that support a focus on quality and safety and promote characteristics of a highly reliable organization (Bisognano, 2010). Nursing leaders should be responsible and accountable for not only educating themselves about quality and safety but to providing this education to nurses throughout the organization. The financial consideration for implementation of quality safety competencies for nurses supports the impact on patient safety and the value of nursing care itself. The benefits of quality safety competencies largely outweigh any costs associated with education or implementation of competency demonstration. Indeed, the cost for not having established quality safety competencies for nurses is the risk of future potential errors, adverse events or expensive uncompensated care. Current value –based purchasing as administered through the Centers for Medicare and Medicaid Services (CMS) establish a process for non-reimbursement for hospital acquired conditions (CMS, 2007). The linking of reimbursement to quality and safety will prove to be a strategic priority for acute care facilities. This will provide the additional incentive for the support of the QSAAN initiative.

Growth of the QSAAN project outside of the descriptive research study will be enhanced with financial support available through grant funding. Funding opportunities will be explored to promote the ability to assess a broader practicing nurse population. Grant funding may have influence to the future ownership of the QSAAN project. For example, the Quality Safety

Education for Nurses (QSEN) program that is the foundation for the QSAAN project is supported by the Robert Wood's Johnson Foundation (QSEN Quality and Safety Education for Nurses, 2011; Robert Woods Johnson Foundation, 2011). It would be beneficial to have strong partnerships between QSEN leadership and QSAAN project leaders.

The results suggest gaps in knowledge of the current practicing nurses' knowledge, skills, and attitudes around the identified QSEN domains. Equipped with this knowledge, the practice setting can adapt educational interventions to support a culture of quality safety application in nursing. Translating the curriculum from nursing academia into practice will benefit the profession by strengthening academic and practice partnerships. There is boundless potential for growth and collaboration between the QSEN program and the QSAAN project. Partnerships within nursing with a singular focus on improving the quality safety environment can become a primary industry driver for patient quality and safety across the healthcare continuum and in the development of future health policy. The nation's health is in the hands of those providing care, enabling these workers with tools to improve their knowledge and skills supports an environment of quality and safety.

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Appendix A, QSAAN Systematic Review

Article Title and Journal	Structural empowerment and patient safety culture among registered nurses working in adult critical care units. *Journal of Nursing Management*, 18(7), 796-803.	A national Delphi to determine developmental progression of quality and safety competencies in nursing education. *Nursing Outlook*, 57, 313-322.	Frameworks for Patient Safety in the Nursing Curriculum. *Journal of Nursing Education*, 49(10), 559-568.
Author/ year	Armellino, D., Quinn Griffin, M., & Fitzpatrick, J. (2010)	Barton,A., Armstrong, G., Preheim, G., Gelmon, S., & Andrus, L (2009)	Chenot, T., & Daniel, L. (2010).
Database and keywords	CINAHL, safety culture, practicing nurses, structural empowerment	CINAHL- QSEN	CINAHL- QSEN, instruments, knowledge, skills and attitudes
Research design	Prospective Case study. A descriptive, correlational design was used	Web-based modified Delphi survey between October 2008 and February 2009	Prospective exploratory quantitative survey study
Level of evidence	Level IV	Level IV	Level IV
Study aim/ purpose	The aim of the present study was to examine the relationship between structural empowerment and patient safety culture among staff level Registered Nurses (RNs) within adult critical care units (ACCU).	To determine whether there was consensus on the developmental progression of knowledge, skill, and attitude elements within the QSEN competencies.	Examine current patient safety education for nursing students' awareness, skills and attitudes about patient safety.
Population studied/ sample size/ criteria/ power	A convenience sample of 257 RNs, working within adult critical care of a tertiary hospital in the United States, was surveyed./ The *a* priori power analysis using a two-tailed correlation yielded a minimum of 82 nurses for a medium effect size (r = 0.30), a = 0.05 and power (1-b) = 0.80 was calculated using G* Power 3.	The sample included 12 QSEN core faculty, 10 QSEN advisory committee members, and the 15 QSEN pilot school project directors	Nursing Students in the southeastern US/ Two samples (n=150 and 318) Sample sized based on Tabachnik and Fidell's (5 respondents per factor analysis = min of 115 participants planned. Response rate 38%
Methods/ study appraisal/ synthesis methods	Instruments included a background data sheet, the Conditions of Workplace Effectiveness (CWEQ-II) and the Hospital Survey on Patient Safety Culture (HSOPSC). Two additional scales, the Job Activities Scale-II (JAS-II) and the Organizational Relationships Scale-II (ORS-II), measured formal and informal power. Each survey item is grouped	The technique includes (a) nomination of an expert panel, (b) distribution of a series of questionnaires in a manner in which anonymity is maintained, (c) statistical analyses of panel members' responses, and (d) controlled feedback of responses to panel members.	3 Phases I=Healthcare Professionals Patient Safety Assessment Curriculum Survey (HPPSACS) (pilot test for reliability and construct validity analysis for tool, II=survey research with nursing students at 7 universities and community colleges, III= content analysis of patient safety curricula from participating institutions and completion of final

	into dimensions to create a composite frequency of the total percentage of positive scores for each safety culture dimension. / For categorical background variables, the two-tailed t-test, or analysis of variance for those background factors with more than two levels were used to analyze differences between the variable and each of the CWEQ-II scores and HSOPSC positive scores. For continuous background factors, Pearson's correlation coefficient was used to determine the correlation between that variable and each of six measures on the CWEQ-II and the overall SE score. The same was calculated for the 12 scales of the HSOPSC.		analysis and data interpretation. Exploratory factor analysis, alpha reliability was used for HPPSACS- subscales scores were used to develop factor constructs. Descriptive statistics, canonical correlation analysis, discriminant function analysis was used in I, II. Qualitative content analysis & Scoring rubric was used for curriculum comparisons.
Primary outcome measures and results	The results of the present study indicate that RNs within this setting perceive themselves to be moderately empowered. Analysis of each of the SE subscales with age ($r = -0.24$, $P = 0.02$), years as an RN ($r = -0.22$, $P = 0.03$) and years at the hospital ($r = -0.27$, $P = 0.0.8$) revealed a significant correlation between all three demographic variables and opportunity. There was a significant difference in SE based on certification ($P = 0.04$). Participants without certification ($n = 68$) perceived a higher level of SE than those who had certification ($n = 31$). Each participant gave the hospital a safety grade.62.5% reported no errors within the past 12 months.	Eighteen experts from 16 different states participated for a response rate of 62%. Consensus at a two-thirds or higher majority was achieved for 152 of the QSEN KSAs. The results of this Delphi Study indicate the necessity to design teaching strategies that support competency development across the entirety of a curriculum.	Patient safety awareness can be measured validly and reliably. All of the schools included at least 3 of the 6 core competencies; only one school had all six competencies in the curriculum. Permission from one author to evaluate tool and view dissertation on-line
Author conclusions /	The higher positive scores in this study were teamwork, communication openness,	A major objective of Phase III of the QSEN work is to provide ongoing support and	This was the first study to investigate prelicensure knowledge of patient safety.

implications of key findings	supervisor /manager expectations, organizational learning and continuous improvement. RNs that were certified viewed the organization's non-punitive responses as favorable. RNs with a higher educational level, years as a RN and years at the hospital had a higher positive score and agreed with supervisor/ manager expectations. RNs with a higher educational degree perceived teamwork within the hospital and as the years as RN increased the positive perception of teamwork within hospital units decreased. Significant correlations were found between the total SE score and questions on the HSOPSC. Improving the RNs' work environment through the provision of an empowering environment and development of a PSC has the potential to disrupt sequences of events that lead to medical error.	development to faculty innovators who are committed to continued development, testing, and dissemination of teaching and assessment strategies, all of which need to be considered in terms of leveled curricular placement.	
Strengths/ limitations	Limitations 1) The participants in this study worked within a limited setting, therefore limiting generalizability to all healthcare settings. The 40% response rate may have implications on the validity of the results.	Not listed	Limitations 1) Limited to senior nursing students- may not be generalizable to other students. 2) HPPSACS tools adapted from instrument developed for medical residents.3) survey is self-reported 4) low rate of return from some institutions 5) few schools chosen to participate
Funding source	None	None	None
Comments	Multiple Instruments (40% response rate). Good use of tools to correlate SE with safety, however, sample utilized was too homogenous to reflect generalization.	Alternative research article on the continued formation of the QSEN model. More in-depth introduction to quality and safety components of QSEN.	Instrument 38% response rate, survey took 15 minutes to complete. **Permission obtained to review tool.**

Article Title	Global Trigger Tool shows	The middle-range theory of	Quality and safety education

and Journal	that adverse events in hospitals may be ten times greater than previously measured. *Health Affairs*,30(4), 581-589.	nursing intellectual capital. *Journal of Advanced Nursing*, 63(1), 94-103.	for nurses. *Nursing Outlook*, 55(3), 122-131.
Author/ year	Classen, D., Resar, R., Griffin, F., Feerico, F., Frankel, T., Kimmel, N., Whittington, J., Frandel, A., Seger, A., & James, B. (2011).	Covell, C. (2008).	Cronenwett, L., Sherwood, G., Barnsteiner, J., Disch, J., Johnson, J., Mitchell, P., & ... Warren, J. (2007).
Database and keywords	ANA – daily news briefing, safety	CINAHL- Nursing knowledge, skills, work environment,	CINAHL- QSEN
Research design	Retrospective comparative study	N/A	N/A
Level of evidence	Level II	Level IV	Level IV
Study aim/ purpose	To evaluate the performance of 3 methods for measuring patient safety and the methods to detect the incidence of adverse events among inpatients in 3 leading hospitals.	This paper is a report of the development of the middle-range theory of nursing intellectual capital. The middle-range nursing intellectual capital theory was derived from intellectual capital theory to make it relevant and applicable to a specific aspect of nursing, continuing professional development. It proposes that the nursing knowledge available in healthcare organizations is influenced by variables within the work environment, and influences patient and organizational outcomes.	The goal was to describe competencies that would apply to *all* registered nurses. The competency definitions are shared with the profession with the hope that nursing, through its professional organizations, can benefit from the work. The purpose is for nursing to evaluate these competencies and if found to be compelling- to begin to use these as a guide to curricular development for formal academic programs, transition to practice, and continuing education programs. In addition, the definitions can provide a framework for regulatory bodies that set standards for licensure, certification, and accreditation of nursing education programs.
Population studied/ sample size /criteria/ power	795 randomly selected adult inpatients from 3 large US tertiary care centers.	The foundation of intellectual capital theory originated in the fields of economics, accounting and organizational learning theory.	N/A
Methods/ study appraisal/ synthesis methods	Evaluation of the incidence of adverse events for inpatients at 3 hospitals using several methods of detecting adverse events:	The middle-range nursing intellectual capital (NIC) theory was developed using the strategies of concept and theory derivation. The principles of	N/A

	retrospective record review, using the Institute for Healthcare Improvements' Global Trigger Tool; each hospital's voluntary sentinel event or other incident or event reporting system; and screening with the Agency for Healthcare Research and Quality's Patient Safety Indicators. / This study methodology was a two-stage review process, refined from the Harvard Medical Practice Study's methodology. The same team of four nonphysician reviewers ("primary reviewers") and two physician reviewers ("secondary reviewers") participated in the review process for all records sampled from the 3 hospitals.	research synthesis were used to provide empirical support for the propositions of the theory.	
Primary outcome measures and results	Among the 795 patient records reviewed, 393 adverse events were detected by all three methods combined. The Global Trigger tool methodology detected 354 adverse events (90.1 percent), the local hospital reporting systems detected 4 adverse events (1.0 percent), and the Patient Safety Indicators detected 35 adverse events (8.99 percent). Adverse events occurred in 33.2 percent of hospital admissions.	The following relationships among the concepts of the middle-range NIC theories are proposed. • Nurse staffing is directly associated with nursing human capital. • Employer support for nurse continuing professional development is directly associated with nursing human capital. • Nursing human capital is directly associated with patient outcomes. • Nursing human capital is directly associated with organizational outcomes. • Nursing structural capital is directly associated with patient outcomes.	N/A
Author conclusions/ implications of key findings	Reliance on voluntary reporting and the Patient Safety Indicators could produce misleading conclusions about the current safety of care in the	The middle-range nursing intellectual capital theory was derived from intellectual capital theory to make it relevant and applicable to a specific aspect of nursing, continuing professional	The authors use this article as an invitation to the nursing community to use, critique, and continuously improve the Knowledge, Skills and Attitudes (KSAs) addressed in

	US health care system and misdirect efforts to improve patient safety.	development. It proposes that the nursing knowledge available in healthcare organizations is influenced by variables within the work environment, and influences patient and organizational outcomes.	the QSEN article.
Strengths/ limitations	Limitations: 1) The determination of adverse events by all of the methods examined probably represents a minimum number of adverse events actually present in these hospitalizations based on medical record documentation alone. 2) Retrospective review did not allow for real time direct observation. 3) The hospitals selected for the review had developed extensive patient safety programs, and might not represent average hospitals across the country. 4) Each of the hospitals is a tertiary referral center that may represent a more complex patient mix than the average hospital.	N/A	N/A
Funding source	Partially funded by the Institute for Healthcare Improvement	None	Funded by the Robert Wood Johnson Foundation
Comments	Pertinent patient safety indicator of reporting of safety and adverse events. Supports the need for education of staff on patient safety competencies.	Primary theoretic foundation for capstone project.	Foundational article that lists all the QSEN competencies.

Article Title and Journal	Quality and safety education goals for advanced nursing practice. *Nursing Outlook*, 57 (6), 338-348.	Improving quality and safety education: The QSEN Learning Collaborative. *Nursing Outlook*, 57(6), 304-312.	The incidence and nature of in-hospital adverse events: a systematic review. *Quality and Safety in Health Care*, 17, 216-223.
Author/year	Cronenwett , L., Sherwood, G., Pohl, J., Barnsteiner, J., Moore, S., Sullivan, D. T., et al. (2009).	Cronenwett, L., Sherwood, G., & Gelmon, S. (2009).	De Vries EN, Ramrattan MA, Smorenburg SM, Gouma DJ, Boermeester MA. (2008).

Database and keywords	CINAHL- QSEN	CINAHL- QSEN	PubMed- Medline, quality and safety, safety culture, instrument
Research design	No study design. Project to develop a QSEN competency model for Advanced Practice Nurses.	Non-research, report on 15-month learning collaborative	Systematic review
Level of evidence	Level IV.	Level IV	Level I
Study aim/purpose	The article describes a two-year process to generate educational objectives related to quality and safety competency development in graduate programs that prepare advanced practice nurses in clinical roles.	To present the rationale, design, activities, and outcomes of the collaborative members who revised curricula, developed new teaching strategies, and established the foundation for future faculty development efforts to advance teaching of quality and safety concepts in nursing education.	To gain an insight into the overall incidence, preventability, outcome and subdivision by location, provider and type of in-hospital Adverse Events and the evidence related to relevant patient safety interventions.
Population studied /sample size/criteria/ power	Phase II work represented APNs who practiced in direct patient care roles (nurse practitioners, clinical nurse specialists, nurse-anesthetists, and nurse-midwives) through work on standards of practice, accreditation of education programs, or certification	N/A	Adult hospitalized patients / The initial search yielded 257 articles, after extensive reviews, 8 articles met the inclusion criteria and represented 74 485 patient records.
Methods/ study appraisal synthesis methods	Representatives participated in a conference with QSEN faculty and advisory board members. After the meeting, a draft of proposed graduate KSAs was mailed to each conference participant with a request for review and feedback.	N/A	Two authors independently performed a formal computer-assisted search of the medical databases Medline (January 1966 to February 2007), Cochrane and Embase (January1980 to February2007). Keywords used were ‘‘adverse events’’ and ‘‘preventable.’’Clinical studies published in peer reviewed journals in the English language were identified. A manual cross-reference search of the eligible papers was performed to identify additional relevant articles./ All studies that used a similar definition of adverse events to evaluate the incidence of

			adverse events in adult hospital patients and included a minimum of 1000 patient records were eligible for inclusion. /All studies used a two-stage retrospective record review technique. / After analysis of the data yielded the categories of events that were responsible for the majority of adverse events, a computer assisted search of Medline was performed to identify interventions relating to these categories of events. Only studies with a level of evidence of one or two were included./ Medians and interquartile ranges (IQR) of incidence, preventability, and the different categories of outcome, location, provider of care and type of event were calculated using Statistical Package for the Social Sciences version 12.0
Primary outcome measures and results	The basic categories of knowledge, skills, and attitudes are similar to the BSN QSEN model. Differences identified include the following. 1)In a few cases, participants in the APN KSA development process argued that an item that had been labeled knowledge was better expressed as an attitude or skill, resulting in the occasional change in column. 2) Higher level objectives were introduced in many cases. 3) New leadership items were included in each competency 4) Other new items represent the expectations associated with mastering a particular specialty and its evidence	N/A	The median incidence of Adverse Events (AEs) was 9.2% (IQR 4.6–12.4%). The median percentage of AEs that was judged preventable was 43.5% (IQR39.4–49.6%). The median proportion of AEs associated with surgical providers was 58.4% (IQR 54.5–70.9%) versus 24.1% (IQR 18.7–40.4%) for medical providers. 80.8% (IQR 75.6–83.2%) were encountered in hospital, versus 14.9% (IQR 12.9–18.7%) out of hospital before admission or after discharge. The majority of events were

	base, information technologies, and outcome measures.		seen in the operating room (41.0% (IQR 39.5–45.8%)) or the patient's room (24.5% (IQR 21.6–26.5%))approximately 50% of AEs are operation- or drug-related: 39.6% (IQR 31.5–50.2%) and 15.1% (11.9–20.4%).
Author conclusions /implications of key findings	Based on the prelicensure experiences the faculty authors believe that APN faculties can use the KSAs to generate ideas appropriate to APN education and transform teaching strategies and curricula to achieve quality and safety educational goals.	One of the benefits of participation in the Collaborative is the enhanced opportunity to interact with other members of the Collaborative who are working on similar projects, and learn together. Having classroom, simulation, and clinical teachers as the project team appeared to expand everyone's vision and led to more widespread changes than would have been possible with one type of faculty expertise alone.	Adverse events during hospital admission are a serious problem, occurring in approximately 9% of all admitted patients and leading to a lethal outcome in 7% of cases. Since a large portion of the adverse events are operation- or drug related, and almost half of these events are preventable, funds and efforts should be concentrated on interventions aimed at reducing these types of events.
Strengths/ limitations	Limitations 1) The process used to generate the APN KSAs did not involve employers of APNs or patient perspectives. 2) All participants were from American-based institutions and organizations. The authors stated there is no way of knowing whether these KSAs would be judged relevant or appropriate in other countries and cultures.	N/A	Limitations 1) conclusions from this review are based solely on retrospective record review studies, and as such, most likely represent an underestimation of the problem 2) the heterogeneity of the studies differed (threshold to include causation, time frame for inclusion of events, differences in methodology and perspectives.
Funding source	Funded by the Robert Wood Johnson Foundation	Funded by the Robert Wood Johnson Foundation.	This research was funded by the Dutch Organization for Health Research and Development (ZonMw), The Hague, and The Netherlands. Patient Safety Program, grant no. 8120.0007.

Comments	Integration of QSEN into the next level of nursing leadership education and competency assessment.	Reference to additional article on initial student evaluation of quality safety education in the program. Initial articles about the formation of collaborative for first design of QSEN courses.	Systematic review of adverse events location, good reference for importance of applying safety concepts.

Article Title and Journal	Education to Bridge the Quality Gap: A Case Study Approach. *Urologic Nursing*, 28(6), 431-453.	Using QSEN to measure quality and safety knowledge, skills, and attitudes of experienced pediatric oncology nurses: an international study. *Quality Management in Health Care*, 18(3), 202-208.	Birds of a feather: introducing a virtual learning community for geriatric nurse educators. *Journal of Continuing Education in Nursing*, 41(5), 203-210.
Author/year	Durham, C. F., & Sherwood, G. D. (2008).	Dycus, P., & McKeon, L. (2009).	Egerton, E., McConnell, E., Corazzini, K., Kitzmiller, R., & Crook, J. (2010).
Database and keywords	PubMed – Medline, quality and safety, practicing nurses	CINAHL- QSEN	CINAHL, telehealth, quality education, nursing
Research design	N/A	Prospective descriptive survey study	N/A
Level of evidence	Level IV	Level IV	Level IV
Study aim/purpose	This article has two goals; 1) Examine the significance of quality and safety in achieving health care outcome goals. 2) to assist educators in designing clinical learning approaches, a pedagogical strategy based on an unfolding case study to address integration of the quality competencies in caring for a patient with a urinary tract infection (UTI).	Development of an instrument to measure nursing quality knowledge, skills, and attitudes for practicing pediatric oncology nurses.	Through the Gero-VLC, nurse educators can connect with nurse clinicians expert in geriatric care; access state-of-the-science information and learning opportunities; participate in collaborative projects; and publish their work on the North Carolina Learning Object Repository. The authors present the Gero-VLC as a best practice for online geriatric nursing education, describe its theoretical underpinnings, and outline a strategy for evaluation.
Population studied/ sample size/criteria /power	Simulation development for use in educational presentation of integrating quality and safety education.	Pediatric oncology nurses from St. Jude Children's Research Hospital and US and Latin American affiliate sites (n=37)	N/A
Methods/	N/A	Quality Improvement	N/A

study appraisal/ synthesis methods		knowledge, skills and attitudes(QUlSKA) -73question electronic questionnaire developed /content validity established by pediatric oncology, QI, and test-construct experts/ descriptive statistics, frequencies, Cronbach's alpha was used for internal consistency, inter-item correlation coefficient ≥0.70	
Primary outcome measures and results	N/A	QulSKA inter-item correlation coefficient was 0.839 (P=.001). Scores were highest for safety and lowest for teamwork. Lowest rated skills were in analysis and QI tools. Permission obtained from authors to review and utilize tool.	N/A
Author conclusions /implications of key findings	Simulation is one way to provide interactive learning experiences for nurses at any level to acquire new skills, while allowing the advancement of clinical judgment around quality and safety competencies.	QulSKA may be reliable to measure quality knowledge, skills and attitudes among pediatric oncology nurse. Nurses were knowledgeable in QI, yet they lacked skills in practice application.	The Gero-VLC is a dynamic, evolving, knowledge building network with extraordinary potential to bridge evidence- based care into clinical practice. Descriptive evaluation data and feedback will be useful in refining future iterations of the site. Its three separate yet interwoven environments, LEARN, CONNECT, and CONTRIBUTE, allow Gero-VLC members to continually interact with evidence-based geriatric content at many different levels, which promotes ongoing growth and change.
Strengths/ limitations	N/A	Limitations 1) no Latin American quality nurse in content validity panel of experts.2) study included items measuring skills in complex statistical analysis. 3) Low rate of nurse participation, unequal group sizes. 4) generalization is limited	N/A
Funding	None	None	This program has been

source			underwritten by a HRSA grant awarded to the Duke University School of Nursing and provided by the Duke University School of Nursing and Comprehensive Geriatric Education Program Award, DHHS—HRSA 1D62 HP01909-01-00.
Comments	Not an actual case study, but rather a description and simulated experience for the case study.	Instrument, 17% participation rate, average time to complete survey 27.9 + 15.7 minutes **Permission obtained to use tool April 7, 2011**	Pre-study design article- a report on what a further study may entail. Incorporates ideas on how to do education and support for nurses over long distances- may be of benefit in consideration of rural hospital settings.

Article Title and Journal	An educational intervention to enhance nurse leaders' perceptions of patient safety culture. *Health Services Research*, 40(4), 997- 1020.	Quality and Nursing: Moving from A Concept to a Core Competency. *Urologic Nursing*, 28(6), 417 -425.	*Keeping Patients Safe: Transforming the Work Environment of Nurses*, The National Academic Press, Washington, DC.
Author/year	Ginsburg, L., Norton, P., Casebeer, A., & Lewis, S. (2005).	Hall, L. W., Moore, S. M., & Barnsteiner, J. H. (2008).	Institute of Medicine (2004).
Database and keywords	CINAHL – safety culture,	PubMed – Medline, quality and safety, practicing nurses	IOM website Patient Safety, Nurses
Research design	A prospective evaluation of a patient safety training intervention using a quasi-experimental untreated control group design with pretest and posttest.	N/A	The IOM convened the Committee on the Work Environment for Nurses and Patient Safety to conduct this study. the committee reviewed evidence on the work and work environments of nurses; related health services, nursing, behavioral, and organizational research; findings from human factors analysis and engineering; and studies of safety in other industries
Level of evidence	Level IIIB	Level IV	Level I
Study aim/purpose	Given (1) the clear need for and dearth of controlled studies of patient safety interventions, (2)	The author has 3 goals: 1) To explain the benefits of nursing involvement in health	This report presents guidance on how to design nurses' work environments

	the fact that most patient safety intervention studies, for good reason, focus on upstream or intermediate outcome variables, and (3) the extent to which patient safety culture is argued to be a critical antecedent of AE reduction, this study sought to carry out a controlled test of an intervention designed to improve nurse leaders' perceptions of patient safety culture in acute care settings. / The goal of this study was to assess whether an intervention targeted at clinical leaders in the nursing would lead to measurable improvements in participant perceptions of patient safety culture.	care quality improvement measures. 2) To present the six competencies to guide professional development as defined by the Institute of Medicine. 3) To define continuous quality improvement.	to enable them to provide safer patient care. It does so by explaining in detail how health care organizations should implement key recommendations of *To Err Is Human* and *Crossing the Quality Chasm*, examining aspects of work environments not addressed in those prior reports, and unifying the evidence from the two prior reports and this report into a strong framework for building work environments that promote the practice of safe nursing care.
Population studied/ sample size/criteria /power	Three hundred and fifty-six nurses in clinical leadership roles (nurse managers and educators/CNSs) in two Canadian multi-site teaching hospitals (study and control). 244 of the 356 subjects (69 %) eligible at baseline and follow-up returned both questionnaires.	N/A	Nursing care in the United States.
Methods/ study appraisal/ synthesis methods	A prospective evaluation of a patient safety training intervention using a quasi-experimental untreated control group design with pretest and posttest was used. Nurses in clinical leadership roles in the study group were invited to participate in two different patient safety workshops over a 6-month period. Individuals in the study and control groups completed surveys measuring patient safety culture and leadership for improvement prior to the first workshop and 10 months later (4 months following the second workshop)./ Exploratory factor analysis of the safety culture items was conducted; repeated measures analysis of variance	N/A	The committee began its work in June 2002. It convened four times during September 2002, November 2002, February 2003, and April 2003 to review evidence and deliberate. Additional deliberations between meetings were held through conference calls. The committee invited testimony from multiple nursing, labor, health care delivery, quality oversight, advocacy, and other organizations.

	and paired t-tests were used to evaluate the effect of the training intervention on perceived safety culture (three factors). Hierarchical regression analyses looked at the influence of demographics, leadership for improvement, and the training intervention on nurse leaders' perceptions of safety culture.		
Primary outcome measures and results	A statistically significant improvement in one of three safety culture measures was shown for the study group ($p<.001$) and a significant decline was seen on one of the safety culture measures for the control group ($p<.05$). Leadership support for improvement was found to explain significant amounts of variance in all three patient safety culture measures; workshop attendance explained significant amounts of variance in one of the three safety culture measures. The total R^2 for the three full hierarchical regression models ranged from 0.338 and 0.554.	N/A	The committee commissioned nine papers to provide background information for its deliberations and to synthesize the evidence on particular issues. The authors and their papers were as follows: Julie Sochalski, Ph.D., "The Nursing Workforce: Profile, Trends, Projections"; Barbara Mark, Ph.D., "The Work of Registered Nurses, Licensed Practical Nurses, and Nurses' Aides in Acute Care Hospitals"; Barbara Bowers, Ph.D., "The Work of Nurses and Nurse Aides in Long Term Care Facilities"; Karen Martin, "The Work of Nurses and Nursing Assistants in Home Care, Public Health, and Other Community Settings"; Ann Rogers Ph.D., "Work Hour Regulation in Safety-Sensitive Industries"; Gail Ingersoll, EdD, and Madeline Schmitt, Ph.D., "Interdisciplinary Collaboration, Team Functioning, and Patient Safety"; Ann Hendrich, "Evidence-based Design of Nursing Workspace in Hospitals"; Pascale Carayon, Ph.D., Carla Alvarado, Ph.D., and Ann Hundt, Ph.D., "Reducing

			Workload and Increasing Patient Safety Through Work and Workspace Design"; and Murat Bayiz, "Work and Workload Measurements in Nurse Staffing Models."
Author conclusions/ implications of key findings	Sensitively delivered training initiatives for nurse leaders can help to foster a safety culture. Organizational leadership support for improvement is, however, also critical for fostering a culture of safety. Together, training interventions and leadership support may have the most significant impact on patient safety culture.	Investment in the development of skills in quality improvement provides a means for nurses to improve the lives of patients, build their own careers, and improve the joy they derive from their work.	This report, which focuses on the third level (i.e., HCOs and their work environments), complements the work of the two prior IOM reports in three ways: It provides greater detail about how HCOs can and should implement key recommendations from *To Err Is Human* and *Crossing the Quality Chasm* in such areas as creating cultures of safety and addressing work design. • It addresses aspects of the work environment that are critical to patient safety but are not addressed in either of the two prior reports, such as the adequacy of staffing levels and worker fatigue. • It unifies the work of the prior two IOM reports and this report into a framework that all HCOs can use to construct work environments more conducive to patient safety.
Strengths/ limitations	Strengths 1) strong response rates (over 80% at pretest, over 70% at post -test and 69% across both. Limitations 1) Nonequivalent control group designs such as the one used in this study do face threats to internal validity 2) Director level leaders were underrepresented in the respondent group at follow –up limiting the ability to generalize results to this group.	N/A	Strengths: National study with top national leaders including an interdisciplinary approach to evaluation.

	3) This study relied on self-report questionnaire data, which could be interpreted to have respondent biases.		
Funding source	Funding for this study was through the Adult Research Committee of the Calgary Health Region and the Canadian Health Services Research Foundation (CHSRF) who helped fund support for the first author through a postdoctoral fellowship.	None	Funded by the Agency for Healthcare Research and Quality.
Comments	Patient safety knowledge changes on nursing leaders. Looking for effects of culture change. One year may not have been enough time for culture change.	Concise article that lists the basics of quality improvement and the integration of concepts into practice.	Landmark report – useful data and reference to articles supporting implementation guidelines for the IOM recommendations for improvement.

Article Title and Journal	Incorporating quality and safety education for nurses competencies in simulation scenario design. *Nurse Educator*, 35(2), 90-92.	New nurses' views of quality improvement education. *Joint Commission Journal on Quality & Patient Safety*, 36(1), 29-35.	The rural nurse work environment and structural empowerment. *Policy, Politics, and Nursing Practice* 9 (1), 28-39.
Author/year	Jarzemsky, P., McCarthy, J., & Ellis, N. (2010).	Kovner, C., Brewer, C., Yingrengreung, S., & Fairchild, S. (2010).	Krebs J.P., Madigan E.A. & Tullai-McGuinness S. (2008).
Database and keywords	CINAHL- QSEN	Joint Commission – quality and safety, knowledge, skills, and attitudes, instrument	CINAHL, rural nurses, structural empowerment
Research design	N/A	Prospective survey study	A non-experimental, descriptive, correlational survey design was used to explore the relationship between work characteristics and structural empowerment.
Level of evidence	Level IV	Level II	Level IV
Study aim/purpose	The authors describe a strategy for systematic planning of simulation-based training that incorporates knowledge, skills, and attitudes as defined by the Quality and Safety Education for Nurses (QSEN) initiative	The purpose of this study was to describe what newly licensed RNs NLRNs) working in hospitals report they learned about QI in their educational programs. This article is intended to fill in this gap by reporting findings from a national sample of newly licensed registered nurses	The purpose of this study was to examine the nurse work environment in rural areas across settings by describing the relationship between structural empowerment and characteristics of the nurse work environment. Research questions:

		(new nurses).	1. What is the relationship between characteristics of the rural nurse work environment and structural empowerment? 2. Does the level of structural empowerment and characteristics of the rural nurse work environment vary by practice setting?
Population studied /sample size/criteria /power	Student nurses to be the focused population for the scenarios	New nurses who participated in the author's panel survey are registered nurses who passed the National Council Licensure Examination (NCLEX) between August 1, 2004, and July 31, 2005 and who worked in hospitals. /The panel sample was selected using a two-stage sample of RNs nested in 51 metropolitan areas (Bureau of the Census Designated areas) and 9 nonmetropolitan rural areas in 34 states* and the District of Columbia (DC). The sampling frame for the quality survey included the 1,694 RNs who worked in hospitals and who answered all questions in the Year 2 survey. From this group of 1,694, 730 RNs were randomly selected. Non-U.S. educated RNs working in hospital setting were excluded from the random sample. This left 663 remaining nurses. Response rate included 460 completed surveys 69.6% (460/663). Further exclusion based on degree, hour worked in QI, or years worked outside of the US prior to licensure, leaving a sample size of 436.	Nurses (N = 97) working in rural home care agencies and hospitals were surveyed./ A nonprobability, convenience sample of registered nurses working in emergency care, home health care, and medical /surgical departments was obtained./ The sample size achieved was 97. The findings of the present study were analyzed to determine the actual power of the study, which was .99.
Methods /study appraisal /synthesis methods	The authors identified KSAs with the greatest potential for simulation based on previous clinical experiences which enabled them to develop activities and events that would challenge students. The focus	Data was collected using an eight-page mailed survey, Quality Improvement Survey: Part of the Newly Licensed Quality Improvement Survey. Multiple mailings were sent to potential responders following	A non-experimental, descriptive, correlational survey design was used to explore the relationship between work characteristics and structural empowerment.

	was to incorporate the QSEN Competencies before, during, and after a simulation scenario.	the Dillman Tailored Design method. These mailings were (1) an alert letter, (2) a letter and the survey, including a $5 incentive, (3) A reminder postcard, (4) a second letter and survey, and (5) a third letter and a survey via U.S. Postal Service next-day mail. The authors also included data that did not change over time, such as previous education leading to first nursing degree, which was available from the two earlier surveys of our panel survey. Those data were merged with the quality data to complete the analytic data set.	The setting for this study was emergency care, home health care, and medical/ surgical departments in four hospitals serving rural communities in southern Ohio. The operational definition for work characteristics of professional nursing practice for this study is the subject's score on the Nursing Work Index–Revised. Structural empowerment was measured by the score on the Conditions of Work Effectiveness Questionnaire–II (CWEQ-II), which assesses the availability of information, support, resources, informal power, and formal power to the nurse. A correlation analysis was conducted to explore the associations of work environment characteristics and structural empowerment. Pearson's correlation coefficient was used to explore the relationship of the summative and subscale scores of the NWI-R and the CWEQ-II for the total sample.
Primary outcome measures and results	5 primary care scenarios were developed	Overall, 159 (38.6%) of new nurses thought that they were "poorly" or "very poorly" prepared about or had "never heard of" QI. Their perceptions of preparation varied widely by the specific topic. Baccalaureate (B.S.) graduates reported significantly higher levels of preparation than associate degree (A.D.) graduates in evidence-based practice; assessing gaps in practice, teamwork, and collaboration;	Significant differences were found between the groups, with home care nurses having significantly higher empowerment scores than medical/ surgical nurses. A strong correlation was found between characteristics of the nurse work environment and empowerment. It is not clear whether there is a causal relationship whereby positive work

		and many of the research-type skills such as data collection, analysis, measurement, and measuring resulting changes.	characteristics drive work empowerment or whether the two are influenced by a third factor.
Author conclusions/implications of key findings	The KSAs developed by QSEN served to guide the development of learning objectives and cue key events in our simulation scenarios. In short, application of this strategy has contributed to systematic planning of simulation-based training in our setting and translation of our most teachable moments into simulation scenarios.	Registered-nurse educational programs need to improve education about and application of QI concepts and to consider focusing QI content into a separate course to have some confidence that faculty will teach it. Despite the strong focus on QI in hospitals, new nurses do not see the connection between QI education and successfully performing their hospital jobs. Both nursing programs and hospitals should help new nurses make the connection. Results show that the nurses do not perceive training from employers as helpful, indicating that employer training efforts require additional study. Only about 23% of respondents found the training helpful for their jobs. Although there is a strong focus on QI in hospitals, new nurses do not see the connection between QI education in their nursing programs and successfully performing their hospital jobs. One possible explanation is that these new nurses continue to focus on providing care to the patients for whom they are responsible and do not see them as having any responsibility for improving the care delivery systems at the unit or higher level that may help them provide higher-quality care in the future. Of the several educational differences between	Our study identifies a significant difference between the level of structural empowerment of home health and medical–surgical nurses. Nursing leaders may need to consider the potential differences between nurse groups, based on their practice setting, when planning and problem solving.

		baccalaureate and associate degree graduates, the most important was that baccalaureate graduates were more likely to have had preparation on evidence-based practice, including assessing gaps in current practice, than associate degree graduates. For organizations that have QI as a priority, hiring baccalaureate graduates rather than associate degree graduates may be more likely to move the organization toward improving quality.	
Strengths/limitations	N/A	Limitations 1) This survey did not assess actual knowledge about QI but rather asked what new nurses thought they had been taught 2) The study did not include diploma and masters or higher degree respondents, so that findings can be generalized only to associate degree and baccalaureate graduates. 3) The new nurses were asked to describe events about three years in the past. Memories of what happened at that distance can be influenced by events occurring during those three years.	Strengths; 1) Response rate of 63% and the likely representation of rural nurses in Ohio in those specific setting. Limitations 1) The study used a convenience sampling of nurses
Funding source	None		None
Comments	Examples of how to incorporate QSEN education into teaching students. The template simulation exercises might be translatable into practicing nurse simulation scenarios as an intervention component at some point in time.	Instrument available. Addresses questions of how prepared nurses felt for the performance of QI. Excellent article for inclusion of relating the importance of QI knowledge for practicing nurses!	Response rate of 63%. Comparison of Magnet recognition as a benchmark for high levels of structural empowerment. Good association of other research on structural empowerment to rural settings.

Article Title and Journal	Development of the Hospital Nurse Surveillance Capacity Profile, *Research in Nursing & Health*, 32, 217-228.	Rural hospital nursing results of a national survey of nurse executives. *Journal of Nursing Scholarship*, 41(3), 129-137.	Quality and safety in graduate nursing education: cross-mapping QSEN graduate competencies with

			NONPF's NP core and practice doctorate competencies. *Nursing Outlook*, 57(6), 349-354.
Author/year	Kutney-Lee, A., Lake, E., & Aiken, L. (2009).	Newhouse,R., Pronovost, P., Morlock, L., Sproat, S.B. (2011).	Pohl, J., Savrin, C., Fiandt, K., Beauchesne, M., Drayton-Brooks, S., Scheibmeir, M., & Werner, K. (2009).
Database and keywords	CINAHL- quality of care, organization	CINAHL, rural nurses	CINAHL- QSEN
Research design	Ex post facto and causal-comparative study. Secondary analysis of data derived from a 50% random sample survey that was conducted in 1999. Empirical referents were extracted from existing survey data from 9,232 nurses in 174 hospitals	Prospective descriptive survey	No study design. Task force work to compare NONPF competencies with QSEN competencies for graduate education.
Level of evidence	Level IIIB	Level IV	Level IV
Study aim/purpose	The purpose of this article is to define, operationalize, measure, and evaluate the nurse surveillance capacity of hospitals. Nurse surveillance capacity is defined as the organizational features that enhance or weaken nurse surveillance	To describe nursing characteristics in small and large rural hospitals and determine whether differences exist in market, hospital, and nursing characteristics	The authors report on the first step of the cross-mapping process, comparing NONPF competencies with the QSEN knowledge objectives Because of the magnitude of the entire inventory of QSEN KSAs for all 6 competencies, only the Knowledge objectives were included in this initial phase of work.
Population studied/ sample size/criteria/ power	Registered Nurses/ 9,232 nurses in 174 hospitals	Rural hospital nurse executives, n=280,	NP graduate to doctoral level.
Methods/ study appraisal/ synthesis methods	A ranking methodology, a Hospital Nurse Surveillance Capacity Profile was created for each hospital	Convenience sample survey/ Nursing Environment Survey (NES) & Essentials of Magnetism EOM) /independent *t* tests and categorical data with χ^2tests, Mann-Whitney *U* test was used if assumptions for the *t* test were not met. $P<.05$was significant	Task force design with consensus
Primary outcome	Greater nurse surveillance capacity was significantly	Larger rural hospitals are more likely to have a clinical ladder,	Overall findings indicate close congruence across

measures and results	associated with better quality of care and fewer adverse events.	higher number of BSN RNs, greater perceived economic and external influences, lower shared vision among hospital staff and higher levels of quality and safety engagement. 77.4% have ADN degree.	the 2 sets of competencies; however there are areas in which gaps are noted or for which clarification is required.
Author conclusions/ implications of key findings	The findings from this study suggest that modifying organizational features to support surveillance is a promising strategy for reducing adverse patient outcomes and improving quality of care. The analysis confirmed that the organizational characteristics that foster nurse surveillance are associated with better quality of care and fewer falls with injury and nosocomial infections based on self-reports from nurses./ Nurses in the highest ranked hospitals took care of approximately two fewer patients than nurses in the lowest decile of nurse surveillance capacity. Over 40% of the nurses in the highest ranked hospitals had a bachelor's degree as compared to 20% of nurses in the lowest decile.	Differences exist between larger and smaller rural hospitals in market, hospital and nursing attributes. Standards of nursing care apply to all settings. Contextual differences exist between small and larger rural hospitals. Nursing interventions need to be tailored to fit the resources, environment and patient needs in the given healthcare settings.	The Task Force agreed that the QSEN Knowledge objectives are not an add-on in terms of new courses, but require new teaching strategies to support integration of these concepts into existing curricula. Faculty development in some areas will be required to accomplish this integration.
Strengths/ limitations	Strengths of this survey data included the large number of respondents and hospitals, and a research design that did not permit hospitals to opt out. A limitation was deriving the data from nurses working in a single large state.	Limitations 1) NES was developed for this study so limited psychometric testing, 2) single respondent (nurse executive) for each hospital. 3) Convenience sample had hospitals with lower census than the sampling frame which may add bias and limit generalizability.	Limitation 1) Only one component of all of the QSEN competencies was able to be reviewed at this time.
Funding source	National Institutes of Health, National Institute of Nursing Research, grants R01-NR04513, T32-NR0714.	Grant from AHRQ	Funded by QSEN and the National Organization of Nurse Practitioner Faculties (NONPF) - Quality and Safety Education for Nurses, is funded by the Robert Wood Johnson Foundation

Comments	Relationship between nursing surveillance and outcomes. Initial collection of data from older data base that may be cause for concern. Well known nursing researcher.	Instrument – Use of an EOM – Essentials of Magnetism tool, interesting comparison on size comparison on rural hospitals. Evaluate if this alternate to direct quality approach	Application of QSEN competencies to the NP with consideration of curriculum and competency from the NONPF.

Article Title and Journal	The new fundamentals in nursing: introducing beginning quality and safety education for nurses' competencies. *Journal of Nursing Education*, 48(12), 694-697.	High reliability and implications for nursing leaders. *Journal of Nursing Management*, 17(2), 238-246.	What is patient safety culture? A review of the literature. *Journal of Nursing Scholarship*, 42(2), 156-165.
Author/year	Preheim, G., Armstrong, G., & Barton, A. (2009).	Riley, W. (2009).	Sammer, C., Lykens, K., Singh, K., Mains, D., & Lackan, N. (2010).
Database and keywords	CINAHL- quality and safety, knowledge, skills	CINAHL, quality and safety, high reliability organization	CINAHL - Patient Safety Culture
Research design	N/A	N/A	Qualitative meta-analysis
Level of evidence	Level IV	Level IV	Level I
Study aim/purpose	Article describes the redesign of the course revision, based on the QSEN competencies definitions, selected beginning KSA s, exemplar resources, and teaching strategies after consideration of a Delphi survey completed in early 2009	To review high reliability theory and discuss its implications for the nursing leader.	To organize the properties of safety culture & to develop a conceptual culture of safety model.
Population studied/ sample size/criteria /power	N/A	N/A	Review of culture of safety literature within US hospital setting
Methods/ study appraisal/ synthesis methods	N/A	N/A	Qualitative meta-analysis with development of conceptual culture of safety framework, and typology of safety culture literature.
Primary outcome measures and results	N/A	N/A	Seven subcultures of safety culture were identified. 1)leadership 2)teamwork 3)evidence-based 4)communication 5)learning 6)just 7)patient-centered
Author conclusions/ implications of	The QSEN competencies provide a framework, and the Delphi survey results	Health care is not a safe industry and unintended patient harm occurs at	Safety culture is complex and not easily understood by hospital leaders, senior

key findings	support an introduction and emphasis of beginning Knowledge Skills and Attitudes early in the nursing student curriculum.	epidemic levels. Health care can learn from high reliability theory and practice developed in other high-risk industries/ Viewed by HRO standards, unintended patient injury in health care is excessively high and quality is distressingly low. HRO theory and practice can be successfully applied in health care using advanced interdisciplinary teamwork training and deliberate process design techniques.	leaders' accountability is key to organization-wide culture of safety.
Strengths/limitations	Limitations 1) Participation in the QSEN learning collaborative provided the unique opportunity to build a model of clinical nursing education redesign by starting at the beginning of the curriculum with a single fundamental of nursing course.	N/A	N/A
Funding source	None	None	None
Comments	Introductory article on basics of QSEN, good reference for background and the introduction of identified components of the QSEN model.	Non-research article, middle range theory in support of establishing an environment that supports safety as a core competency.	Link between leadership and safety culture. Plan for inclusion.

Article Title and Journal	Connecting nursing education and practice: a focus on shared goals for quality and safety. *Creative Nursing*, 16(1), 37-43.	Competence development among nurses: The process of constant interaction. *Journal of Continuing Education*, 38(5), 211-218.	Value-added care: a paradigm shift in patient care delivery. *Nursing Economic$*, 26(5), 294-301.
Author/year	Sullivan, D. (2010).	*Tabari-Khomeiran, R., Parsa-Yekta, Z. (2007)*	Upenieks, V., Akhavan, J., & Kotlerman, J. (2008).
Database and keywords	CINAHL, quality and safety, practicing nurses	CINAHL, rural nurses	CINAHL, practicing nurses, quality
Research design	N/A	Grounded theory methodology- qualitative design case study	Prospective cohort study. A workflow methodology, prospective comparison design was used to determine the relative amounts of time allocated to workload activities among RNs in two different telemetry units and one medical-surgical

			unit
Level of evidence	N/A	Level IIIA	Level II
Study aim/purpose	The purpose of this article is to summarizes and discusses QSEN's accomplishments and upcoming activities within a framework of the factors contributing to the separation of the education and practice worlds and makes recommendations for building on the progress derived from QSEN activities.	To explore the competence development process among nurses	The purpose of this pilot study was two-fold: (a) to gain an understanding of how much time RNs spent in value-added care, and (b) whether increasing the combined level of RNs and unlicensed assistive personnel increased the amount of time spent in value-added care compared to time spent in necessary tasks and waste
Population studied/ sample size/criteria/ power	Student nurses	18 clinical registered nurses, 5 nursing managers, 3 nursing instructors, and 7 nursing students, all of whom were working or studying in university-affiliated hospitals or faculties. The adequacy of the sample was achieved through description of the phenomenon until no new data emerged.	A convenience sample of a telemetry floor divided into two 30-bed telemetry units and a 20-bed medical-surgical unit constituted the sampling frame for the study. RNs providing patient care were the study group- chosen for participation on random days/
Methods/ study appraisal/ synthesis methods	N/A	In accordance with grounded theory method, data collection and data analysis were performed simultaneously using the constant comparative method.	During randomly selected days, any of seven RNs present on the telemetry units and any of four RNs on the medical- surgical unit were selected and shadowed by a research assistant (RA) to record workflow activities. Category and input data into the PDA. Categories were divided into value-added activities, necessary, and non-value added activities. These categories were divided by level: direct care, indirect care, documentation, administrative, waste, and other /Descriptive statistics were applied to the distribution of workflow sampling categories. Regression analysis was

			used to determine whether an increase in the number of RNs would increase the amount of time spent in value-added care; as well as whether an increase of time spent in value-added care decreased the amount of time RNs spent in non-value-added care./ All *p* values were calculated using ANOVA models and analyses were performed using STATA 10.
Primary outcome measures and results	N/A	Data revealed that nurses developed competence through an iterative process called "the process of constant interaction." This five-stage process was found to be a complex, ongoing interpersonal dynamic between the nurse and the surrounding world. Five key phases emerged as being pivotal to the process of competence development—driving force recognition, providing appropriate requisites, experience, consolidation, and integration	There was no significant difference in the addition of front-line staff and the proportionality of more time spent in value-added care and less time in necessary tasks and waste.
Author conclusions/ implications of key findings	The lessons learned from the QSEN initiative have great potential for helping bridge the nursing education–practice gap. Enhancing faculty expertise in QSEN content and reconfiguring clinical experiences could contribute to strong education–practice partnerships that will benefit all.	Although the nurse is the key player in the process of his or her own competence development, employers have a pivotal responsibility in facilitating the nurse's progress toward ongoing professional competence, which is a key element of the quality of care. Competence development depends heavily on nurses' own initiative. However, change needs to occur in the way employers sustain these initiatives, not only in the type and number of competence development programs they offer, but also in facilitating the informal initiatives that nurses use for improving their	Numbers alone cannot explain the entire scope of care, nor can adding RNs to the equation increase the amount of time spent in value-added care.

		competence	
Strengths/ limitations	N/A	This was a qualitative study conducted in one national context with a relatively small number of participants.	Limitations 1) Research observations were utilized versus self-sampling. Since nurse activity involves multi-tasking, it is not always possible for an observer to accurately classify the work being performed. 2) Nurse's aides and LVNs were not observed since they were not included in the staffing ratio formula, which made for an incomplete picture of the overall nursing activities on the unit.
Funding source	None	The present work was supported by funding from Tabriz University of Medical Science, Iran.	Dr. Upenieks is a co-investigator for the Robert Wood Johnson Foundation Initiative, *Transforming Care at the Bedside Phase II & III,* 2004-present.
Comments	Non research article explaining QSEN concepts needed to establish foundational concepts.	Qualitative approach to understand the competency development of nurses. International study with some question to level of application to the international community.	Understanding the work of nurses and what activities are parts of nursing practice.

Article Title and Journal	Nursing implementation science: how evidence-based nursing requires evidence-based implementation. *Journal of Nursing Scholarship*, 40(4), 302-310.	Quality and Safety Education for Nurses Clinical Evaluation Tool. *Journal of Nursing Education*, 49(9), 517-522.	Improving patient safety: An economic perspective on the role of nurses. Journal of Nursing Management, (17), 223-229.
Author/year	Van Achterberg, T., Schoonhoven, L., & Grol, R. (2008).	Walsh, T., Jairath, N., Paterson, M., & Grandjean, C. (2010).	Warburton, R. (2009).
Database and keywords	CINAHL, Evidence based practice, dissemination, implementation	CINAHL- QSEN, instruments, knowledge, skills and attitudes	CINAHL- patient safety, cost-effective
Research design	N/A	Prospective validation study. Pilot evaluation of the Clinical Performance Evaluation Tool (CPET) tool as adapted to diverse clinical settings.	N/A
Level of evidence	Level IV	Level IV	Level IV - This is a review article, synthesizing the results of research on

			patient safety.
Study aim/purpose	The purpose for this paper was to address common determinants of the persistence of ineffective practices or practice improvement, to discuss the effectiveness of implementation strategies, and to apply this to nurse-delivered patient care.	The purpose of this article is to provide a preliminary report of the process that was undertaken by the faculty teaching in the undergraduate program of a school of nursing to develop a Clinical Performance Evaluation Tool (CPET).	This paper synthesizes patient safety research and insights from economic theory to generate guidance for nurse managers. The paper describes the key roles nurses and nurse managers can play in improving patient safety, and explains how insights from health economics can help inform and enhance this role, helping nurse managers to set priorities for improvement and for future research.
Population studied/ sample size/criteria/ power	N/A	Nursing student/ sample of students taking their first adult, medical-surgical nursing course (N = 25).	N/A
Methods/ study appraisal/ synthesis methods	N/A	The areas of specialization covered by the tool are medical-surgical, psychiatric, and obstetric and community health Nursing/ As part of the CPET development process, validity, reliability, sensitivity, and meaningfulness were considered. Also considered was the measurement burden for faculty who would use the CPET to evaluate clinical performance for all students within a specific clinical section./ Content validity of the CPET was established by mapping of CPET content to the QSEN competencies/ reliability of technique and interrater reliability were addressed. Stability of CPET measures (i.e., test-retest reliability) was not a major concern because it would be expected that student performance, and hence evaluation of performance, would change over time.	N/A
Primary	N/A	The CPET is generic enough	N/A

outcome measures and results		to be used or adapted for use by other nursing programs. Based on input from undergraduate faculty, other school of nursing faculty and clinical associates subsequent revision to the CPET and face validity of the CPET was supported. Content validity of the CPET was established by mapping of CPET content to the QSEN competencies.	
Author conclusions/ implications of key findings	Common elements for implementation of research include knowledge, cognitions, attitudes, routines, social influence, organization, and resources. Elements are often specific for innovation, context, and target groups. Strategies focused on individual professionals and voluntary approaches currently dominate implementation research. A strategic approach to using reminders, decision support, information and communication technology (ICT), rewards, or a combination of strategies are often the most effective elements in encouraging implementation of evidence and innovations. Linking elements to theory-based strategies can facilitate optimal implementation plans. Use of theory and evidence from implementation science can facilitate evidence-based implementation.	The CPET can be used by the student as a tool to provide a composite picture of their performance as they prepare to enter their professional practice. A full pilot test occurred in the fall of 2008 in all areas of the clinical setting (medical-surgical, psychiatry, obstetrics, and pediatrics). The modified version of the CPET was used in the spring 2009 semester in all clinical areas. / Further pilot testing is planned to generate data to completely evaluate the validity, reliability, and efficiency of the tool. Validity and reliability assessment will include clinical faculty review, score-rescore assessment, and evaluation of the time required to complete the evaluation on the part of student, faculty, and clinical coordinators. Efficiency benchmarking will be conducted by averaging the time it takes experienced and inexperienced users of the tool to complete the evaluation.	Evidence on the costs and effects of most safety improvements is still lacking. Nurses can and should take a leadership role in implementing changes and evaluating their costs and effects. To lead improvements in patient safety, nurse managers need to learn to use the Plan-Do-Study-Act Improvement Cycle, and need to develop an awareness of and ability to measure the costs and effects of changes. These changes would allow nurse managers to better make the business case for patient safety.
Strengths /limitations	N/A	Limitations 1) It was beyond the scope of the initial project and the required timeline for development and implementation of an evaluation tool to address construct validity. 2) Interrater reliability of technique in CPET application and student evaluation was more	N/A

		challenging to address. Interrater reliability could not be addressed through calculation of a correlation coefficient measuring the degree of agreement between two raters evaluating the same student because of the financial impact. 3) Sensitivity of the CPET was also a major consideration since this tool was pass/fail versus a more sensitive alpha grading approach. To help to minimize this effect, a three-point, ordinal level of measurement was used to help in sensitizing students to the need for change before their final grade was determined.	
Funding source	None	None	None
Comments	Review of several models/systems of implementation science. Good foundational article for application to practice.	Evaluation tool of QSEN competencies for student nurses. Good comparative content to application to practicing nurses. Alternative manner of assessing competency of practicing nurses.	Administrative support for the economic impact of safety environments.

Article Title and Journal	Validation of a method to measure resident doctors' reflections on quality improvement. *Medical Education*, 44, 248-255.	Measuring Faculty Reflection on Adverse Patient Events: Development and Initial Validation of a Case-Based Learning System. JGIM: *Journal of General Internal Medicine*, 26(3), 293-298.
Author/year	Wittich CM, Beckman TJ, Drefahl MM, et al. (2010).	Wittich, C. M., Lopez-Jimenez, F., Decker, L. K., Szostek, J. H., Mandrekar, J. N., Morgenthaler, T. I., & Beckman, T. J. (2011).
Database and keywords	CINAHL, quality and safety, knowledge, skills and attitudes	PubMed- Medline, quality and safety, instrument
Research design	Prospective validation study.	Prospective validation study.
Level of evidence	Level IV	Level IV
Study aim/purpose	Residents' abilities to reflect on QI opportunities are unknown. This article reports on the development and determination of the validity of the Mayo Evaluation of Reflection on Improvement Tool (MERIT) for assessing resident	To develop and validate a computerized case-based learning system (CBLS) to measure faculty physicians' reflections on adverse patient events.

	reflection on QI opportunities.	
Population studied/ sample size/criteria/ power	Residents (n=50) This study utilized six raters who completed assessments of 50 unique resident logs and yielded 300 evaluation forms, which comprised the data for this study.	Staff physicians in the Department of Medicine at Mayo Clinic Rochester.
Methods/ study appraisal/synthesis methods	The Mayo Evaluation of Reflection on Improvement Tool (MERIT) was designed to assess resident doctors' reflections on improvement opportunities captured in their improvement logs. The content of MERIT, which consists of 18 items structured on 4-point scales, was based on existing literature and input from national experts. Using MERIT, six faculty members rated 50 resident reflections. Factor analysis was used to examine the dimensionality of MERIT instrument scores. Inter-rater and internal consistency reliabilities were calculated.	The CBLS was developed by Mayo Clinic information technology, medical education, and QI specialists. The reflection questionnaire, adapted from a previously validated instrument, contained eight items structured on five-point scales. Three cases, representing actual adverse events, were developed based on the most common error types: systems, medication, and diagnostic. In 2009, all Mayo Clinic hospital medicine, non-interventional cardiology, and pulmonary faculty were invited to participate. Faculty reviewed each case, determined the next management step, rated case generalizability and relevance, and completed the reflection questionnaire. / ANOVA and linear regression analysis were used to determine associations between overall reflection score and categorical or continuous variables, respectively. Statistical significance was set at <0.05.
Primary outcome measures and results	Factor analysis revealed three factors (eigenvalue; number of items): Reflection on Personal Characteristics of QI (8.5; 7); Reflection on System Characteristics of QI (1.9; 6), and Problem of Merit (1.5; 5). Inter-rater reliability was very good (intraclass correlation coefficient range: 0.73–0.89). Internal consistency reliability was excellent (Cronbach's a 0.93 overall and 0.83–0.91 for factors). Item mean scores were highest for Problem of Merit (3.29) and lowest for Reflection on System Characteristics of QI (1.99).	Factor analysis and internal consistency reliability were calculated. Associations between reflection scores and characteristics of faculty and patient cases were determined. /Forty-four faculty completed 107 case reflections. The CBLS was rated as average to excellent in 95 of 104 (91.3%) completed satisfaction surveys. Factor analysis revealed two levels of reflection: Minimal and High. Internal consistency reliability was very good (overall Cronbach's α=0.77). Item mean scores ranged from 2.89 to 3.73 on a five-point scale. The overall reflection score was 3.41 (standard deviation 0.64). Reflection scores were positively associated with case generalizability (p=0.001), and case relevance (p=0.02).
Author conclusions/ implications of key findings	Validity evidence supports MERIT as a meaningful measure of resident reflection on QI opportunities. Our findings suggest that dimensions of resident reflection on QI opportunities may include personal, system and Problem of Merit factors. Additionally, residents may be more effective at reflecting on 'problems of merit' than personal and systems factors	The CBLS is a valid method for stratifying faculty physicians' levels of reflection on adverse patient events. Reflection scores are associated with case generalizability and relevance, indicating that reflection improves with pertinent patient encounters.

Strengths/limitations	Limitations 1) This is a cross-sectional, single-institution study involving only 50 improvement logs, which may limit the generalizability of our findings. 2) The high reliability of MERIT scores may reflect extensive rater training, which should be considered when applying our instrument to improvement opportunities in the community at large. 3) Measuring resident reflection is somewhat burdensome as it requires that residents have time to enter thoughtful reflections into an electronic database.	Strengths 1) This is the first study of a cased-based learning system for measuring faculty physicians' reflections on adverse patient events. Limitations 1) This study was conducted at a single academic institution, which may limit external validity 2) The response rate was low and data was missing for some participants who did not answer all the multiple choice questions, which may limit the sensitivity of our analyses. 3) Finally, study participants completed several cases apiece, which could be considered clustered data, which may limit our interpretation of the factor analysis.
Funding source	None	None
Comments	Instrument – Phase 2 concepts. Review of use of reflection for subsequent alternative educational methodology for teaching quality and safety. Not realistic at this time related to time commitment.	Instrument – Phase 2 concepts. Application of reflection research on medical residents into the practice setting. An example of translation of self-reflection as a tool to improve quality and safety in healthcare. Not realistic at this time related to time commitment.

Appendix B, Demographics of U.S. Registered Hospitals

Table B.1

Demographics of U.S. Registered Hospitals

Total Number of All U.S. Registered * Hospitals	5,795
Number of U.S. **Community** ** Hospitals	5,008
Number of Nongovernment Not-for-Profit Community Hospitals	2,918
Number of Investor-Owned (For-Profit) Community Hospitals	998
Number of State and Local Government Community Hospitals	1,092
Number of Federal Government Hospitals	211
Number of Nonfederal Psychiatric Hospitals	444
Number of Nonfederal Long Term Care Hospitals	117
Number of Hospital Units of Institutions (Prison Hospitals, College Infirmaries, Etc.)	15
Total Staffed Beds in All U.S. Registered * Hospitals	944,277
Staffed Beds in Community** Hospitals	805,593
Total Admissions in All U.S. Registered * Hospitals	37,479,709
Admissions in Community** Hospitals	35,527,377
Total Expenses for All U.S. Registered * Hospitals	$726,671,229,000
Expenses for Community** Hospitals	$656,156,258,000
Number of Rural Community Hospitals**	1,997
Number of Urban Community Hospitals**	3,011
Number of Community Hospitals in a System ***	2,921
Number of Community Hospitals in a Network ******	1,485
Table 8: Total Number of U.S. Hospitals, American Hospital Association, 2011.	

*Registered hospitals are those hospitals that meet AHA's criteria for registration as a hospital facility. Registered hospitals include AHA member hospitals as well as nonmember hospitals.

Appendix C, Demographics of Colorado Hospitals and Comparison of Practice Settings for RNs in Colorado

Table C.1

Colorado Hospital Ownership 2008

Colorado Hospitals by Ownership Type 2008				
Ownership Type 2008	Colorado Number	CO %	United States Number	US %
State/Local Government	28	35.90%	1,105	22.10%
Non-Profit	37	47.70%	2,923	58.30%
For-Profit	13	16.70%	982	19.60%
Total	78	100%	5,010	100%

(Kaiser Foundation, 2011)

Table C.2

Comparison of Practice Settings for RNs in Colorado

Comparison of practice settings for RNs in Colorado	Urban RNs	Rural RNs
Acute care facility	**61.60%**	**53.20%**
Skilled nursing facility	**8.20%**	**15.00%**
Community based practice	**18.70%**	**23.70%**
Non-clinical setting	**7.80%**	**5.40%**
Other	**3.60%**	**2.60%**

Source: 2008 Colorado RN Workforce Survey, Colorado Health Institute (CHI, 2009)

Appendix D, Permission from Original Researchers to use QuISKA Tool

Email from Dr. Paula Dycus- received September 9, 2011

From: Paula.Dycus@lebonheur.org
To: kathleenbradley22@hotmail.com
Subject: RE: QUISKA
Date: Fri, 9 Sep 2011 01:05:04 +0000

Kathy,
I will be happy to serve on your review panel. The sooner you can get your revisions to me the better as I have a very tight schedule for September. I, too, am an MPD and I have two huge projects due in early October--a video and Countdown event. Are you already a Magnet designated facility? We are going for our initial designation.

Paula

Paula Dycus, DNP, RN, CPHQ, NEA-BC
Administrative Director of Professional Practice & Research
Le Bonheur Children's Hospital
50 N. Dunlap
Memphis, TN 38103

Figure D.1. Email from P. Dycus dated September 9, 2011

Email from Dr. Leslie McKeon - received March 28, 2011

From: McKeon, Leslie M (lmckeon@uthsc.edu)
Sent: Mon 3/28/11 7:38 AM
To: Kathleen Bradley (kathleenbradley22@hotmail.com)
Hi Kathleen,

Thank you for your interest in our assessment. I forwarded your request to Dr. Dycus, the primary author of the tool. Also to let you know, I am working on a case study approach to assessing QSEN competencies based on our results.

Dr. McKeon

Figure D.2. Email from L. McKeon dated March 28, 2011

Email from Dr. Leslie McKeon- received September 8, 2011

From: McKeon, Leslie M [mailto:lmckeon@uthsc.edu]
Sent: Thu 9/8/2011 4:25 PM
To: Bradley, Kathy
Subject: RE: Request for consultation on QUISKA instrument

Hi Kathy,

I would be glad to review your instrument.

Leslie

Figure 4: Email from L. McKeon

Figure D.3 Email from L. McKeon dated September 8, 2011

Appendix E, Advisory Panel and Coordinating Council for Phase II of QSAAN Project

Phase II the QSAAN project will include the same leaders within phase I with the expansion of the Advisory panel to a formal Advisory Board. The membership of the Advisory Board is designed to have specific representation from within the nursing profession.

Qualifications of Advisory Board

The Advisory Board will consist of thirteen members representing; nursing practice settings, QSEN program, academia, nursing excellence centers, direct care registered nurse, advanced practice registered nurse, nursing professional organization leader, nursing leader in staff development, representative from healthcare quality, nursing leadership representative from homecare or long term care, and a healthcare consumer. The subsequent list defines the representatives and the rationale for board membership.

Table E.1

QSAAN Advisory Panel Phase II

Chair of Advisory Board Leader within Nursing Practice	This position is chosen for the reason that QSAAN is applicable to practicing nurses within the practice setting. A nursing leader from this setting is more aware of characteristics of staff, practice issues, regulatory requirements and outcome measurements.
QSEN Representative from Project team	This position is chosen for continuity with the QSEN project. The application from research to practice will be enhanced with a knowledgeable addition from the core team.
QSEN representative from academia	This position is chosen again for continuity with the QSEN program. This representative also brings knowledge and experience with QSEN concepts and can serve as a content expert during discussions of background and application.
Nursing Center of Excellence representative	This position is chosen as a representative of nursing practice oversight. This representative has a neutral position within nursing and brings a focus for the nursing community as a whole. This

	representative also brings an awareness of other venues of nursing practice that might be considered.
Nursing leaders in practice (CNO, Nursing Director)	This position represents two to three seats on the board. The inclusion of multiple levels of nursing leaders in practice carries a different perspective of reality in the application of this concept into the work setting. This project is practice setting specific and thus should have the largest representation on this board.
Direct care staff nurse	This position is a representative of practicing nurses. This role can be expanded to up to two direct care nurses based on the content and the need for oversight. This role will be considered for other positions within taskforces.
Advanced Practice Nurse (CNS)	This position is a representation of advanced practice nurses. The position is ideally designated for a Clinical Nurses Specialist as this role is more likely to have staff development skill sets and applicability to the QSAAN concepts.
Nursing leader in Professional Organization (AONE)	This position may be determined based on funding sources or per the recommendation of the other core members of the Advisory board. This role would represent nursing leadership expertise and bring in a national focus to this project. This role may also bring awareness of additional practice sites or expansion opportunities.
Nursing leader in staff development	This role is needed to represent the work of nursing leaders in the preparation and competency assessment of practicing nurses. This role brings working knowledge and expertise in competency assessment and will be a key driver in assessing outcomes of this project. This role will also be represented by other nursing leaders in taskforce positions.
Healthcare representative from quality organization (AHRQ)	This position is a conduit to national quality initiatives and may come from this organization or may be represented by other national level quality improvement organizations. This role will serve as an advisor to current and future quality initiatives within the U.S. healthcare arena. This position also adds credence to the project.
Nursing leader in home	This position represents nursing practice outside of the acute care setting. As nursing positions shift from acute care to community,

care/long-term care	this role will advise the group on the applicability of these competencies for nurses in this setting. This role will also be represented on other taskforces.
Consumer of healthcare	This position represents the clients of healthcare service. This role is the reality of perception of the consumer and brings balance to the group and focus for the need for quality and safety as prime directives for healthcare.

Advisory Board members will be nominated to participate through a national search. Participation on the advisory board is intended to be an honor and noted recognition for the members. Advisory Board members will not be paid positions, although provision for travel will be dependent upon grant funding. Publication of membership will be made through professional nursing organizations to recognize members. Members that can no longer participate will be asked to assist with recommendation of replacement and given a plaque in acknowledgement of participation. Advisory Board names will be included on publication of reports sent to funding sources.

In addition to the Advisory Board, a Coordinating Council will be an important component of Phase II QSAAN project structure. This council will have oversight and support three additional taskforce teams, each specifically designed for task completion of research, competency development and dissemination. Leaders of the coordinating council and task forces will be determined as the program expands.

Appendix F, QSAAN Budget and Resource, and Grant Funding Proposal

Table F.1

QSAAN Budget and Resources

QSAAN Budget and Resources		
Resource	**Item**	**Amount**
	In –Kind - Survey Monkey rental (supplied by primary investigator site)	$200
	In-Kind - Facility donated - participation cost facility specific - nurse completion of survey (.47 hours x $35/hour x @ 500 participants)	$8,225
Liabilities		
	SPSS Software Rental	$100
	Statistician consultant - ($50 per hour x 20 hours)	$1,000
	Administrative consultation - ($25 per hour x 4 hours)	$100
	Printing - (Facility Report - $50 x 4 facilities)	$200
	Incentive Prizes - (Pizza- $100 per facility)	$400
	Dissemination at QSEN Forum - (Travel -$300)	$300
	Dissemination at QSEN Forum - (Registration - $150)	$150
	Dissemination at QSEN Forum - (Hotel - $380)	$380
	Dissemination at QSEN Forum - (Poster - $100)	$100
Net costs	Including In-Kind, Primary Investigator cost	$10,955
Budgeted Request	Requested resource from STTTI (not dissemination)	

Table F.2

Grant Funding Proposal

Grant Funding Proposal	
Organization	Amount
Phase I Funding Sources	
Sigma Theta Tau International- Alpha Kappa Chapter at Large	$1,500
Phase II Funding Sources	
Robert Woods Johnson Foundation	TBD
American Association of Colleges of Nursing (AACN)	
American Organization of Nursing Leaders (AONE)	

Appendix G. Goals, Objectives, and Assessment of Application to Practice Clinical Experience- QSAAN

Goals/Objectives, Outcomes, and Evaluation Plan	**Location(s) including setting and length of time at each location**	**Assessment of Objectives**
1. Design Nursing leadership job description that reflects responsibility to nursing performance, practice and innovation. (Structure)	1. Porter Adventist Hospital – Nursing leadership – 1:1 with CNO, Director meeting, departmental meeting, HR (12.5 hours)	1. (Structure) This goal has been slower to progress due to the demands of other activities. I think that working in the role with help with the definition of the final Job Description. This goal is met
2. Design nursing quality strategic plan incorporating facility level strategic plans, department specific quality plans, regulatory standards, and nursing division outcomes. (Structure)	2. Porter Adventist Hospital – Nursing leadership – 1:1 with CNO, Director meeting, individual meetings with Directors, meetings with quality department, independent work (226 hours)	2. (Structure) The amount of time spent on this activity is surprising and much greater than expected. This also reflects the need for a nursing leader who can be an expert in professionalism. This goal is met.
3. Analyze information technology as a tool to promote quality outcomes. (Process)	3. Porter Adventist Hospital, Centura Health – Medisolv training, meeting with Nursing business systems manager, meeting with quality director, meeting in informatics nurses, 1:1 with CNO, independent work (31.5 hours)	3. (Process) This goal is achieved a little bit at a time. The learning opportunities will come as the time permits. There is opportunity for further learning to understand the reporting capabilities and structures within a healthcare system. This goal is in process
4. Design a template to facilitate application of NDNQI (National Database for Nursing Quality Indicators) data integration into unit specific strategic plans. (Process)	4. Porter Adventist Hospital, Centura Health – Medisolv training, meeting with Nursing business systems manager, meeting with quality director, meeting in informatics nurses, 1:1 with CNO, independent work (38 hours)	4. (Process) The beginning work has started on this process. The work was faster than anticipated and ties together with goal #3.
5. Collaborate with quality and nursing business systems to identify quality reporting and benchmarking capabilities for an acute care hospital. (Process)	5. Porter Adventist Hospital, Medisolv training, meeting with Nursing business systems manager, meeting with quality director (27.5 hours)	5. (Process) There were some opportunities for collaborative work, but the option for expansion will be a must in future months. This goal is one to devote more time in future rotations. This goal is in process.

Goals/Objectives, Outcomes, and Evaluation Plan	Location(s) including setting and length of time at each location	Assessment of Objectives
6. Utilize quality data including NDNQI/ Core Measures, to identify below median outcomes of vulnerable populations of hospitalized patients. Outcomes to include hospital acquired conditions (CAUTI, Pressure Ulcers, Falls, CLABSI)(Outcome)	6. Porter Adventist Hospital, NDNQI training, meeting with nursing business systems manager, meeting with quality director, meeting with Nurse Scientist, 1:1 with CNO (62.5 hours)	6. (Outcome) The goal for this topic was met with identification and graphing of outcomes. This goal is met.
7. Develop an educational workshop for direct care givers with a focus on shared governance (accountability) and quality. (Structure)	7. Porter Adventist Hospital – meeting with Professional Development department, meeting with co-teachers, meeting with quality director, literature search, class curriculum design, course design, marketing and registration work, clinical contact hour work, paperwork & handouts, day of class hours, analysis of evaluations. (89.75 hours)	7. (Structure) The intention of educating staff on topics of shared governance and quality has changed, but is in continuation in different venues. This will be an ongoing process.
8. Educate direct care givers in the development of unit specific strategic plans. (Process)	8. Porter Adventist Hospital – meeting with Professional Development department, meeting with co-teachers day of class hours, analysis of evaluations (39.5 hours)	8. (Process) This goal is met through monthly meetings and individual coaching sessions.
9. Educate direct care givers in the role of a professional in accountability of quality and safety outcomes. (Process)	9. Porter Adventist Hospital – meeting with Professional Development department, meeting with co-teachers day of class hours, analysis of evaluations (87 hours)	9. (Process) This is an evolving goal with opportunities for education in different venues. The need for a variety of offerings with just-in-time teaching is proving to be effective in expanding the knowledge of direct care staff related to these topics.
10. Design nursing medical/surgical educator job description incorporating roles of Magnet champion, quality/safety process improvement champion. (Structure)	10. Porter Adventist Hospital – Nursing leadership – 1:1 with CNO, Director meeting, individual meetings with Directors, meetings with quality department, meeting with informatics nurse, independent work (17 hours)	10. (Structure) (Educator role) This goal is met with the development of a new role and job description.

Goals/Objectives, Outcomes, and Evaluation Plan	Location(s) including setting and length of time at each location	Assessment of Objectives
11. Establish partnership with other acute care facilities to promote quality/ accountability education. (Process) 12- 725 B-D. Assist in the draft of a grant application to promote educational interventions directed at shared governance, quality safety outcomes & leadership. (Process) 13- 725 B-D. Submit abstracts for conference presentations of shared governance, quality safety outcomes, and leadership education. (Outcome) 14- 725 B-D. Collaborate with other healthcare facilities to identify below median outcomes of vulnerable populations. (Process) 15- 725 B-D. Evaluate the effectiveness of unit level shared governance on unit level outcomes. (Outcome) 16. Evaluate the effectiveness of unit level EBP project on unit level outcomes. (Outcome)	11. Centura Health- 1:1 with CNOs –South Denver, meetings with other facility quality staff, meeting with other facility nursing leadership staff, meeting with other facility professional development (89 hours) 12. Work with Nurse Scientist and South Denver EBP Council, Foundations (10.75 hours) 13. Work with Nurse Scientist and various nursing leaders on abstract formation and subsequent presentations. (132 hours) 14. Meet with research sites to identify outcomes relative to study. (2 hours) 15. Review NDNQI outcome data and perform comparative analysis, including meeting with unit level leaders. (18.5 hours) 16. Evaluate the formation of unit level EBP projects for the various areas participating in study. (11 hours)	11. (Process) This partnership will be significant with future relationships for this capstone project. This goal is met. 12. (Process) This goal is met 13. (Outcome) There were several opportunities and work projects that were covered during this goal. The dissemination of nursing programs is a demonstration of nursing excellence and was a high point to promote quality improvement. This goal is met. 14. (Process) There are not many opportunities to work on this goal, however, the opportunities may arise during future quality improvement activities. 15. (Outcome). There are conflicting priorities that sometimes prevent analysis. This goal will get increased attention in the future. 16. (Outcome) This goal was new to this project and started with the initiation of a couple of unit based projects. The leadership role for these has been in support, encouragement and coaching. This goal is ongoing.

Appendix H, QSAAN Conceptual Model

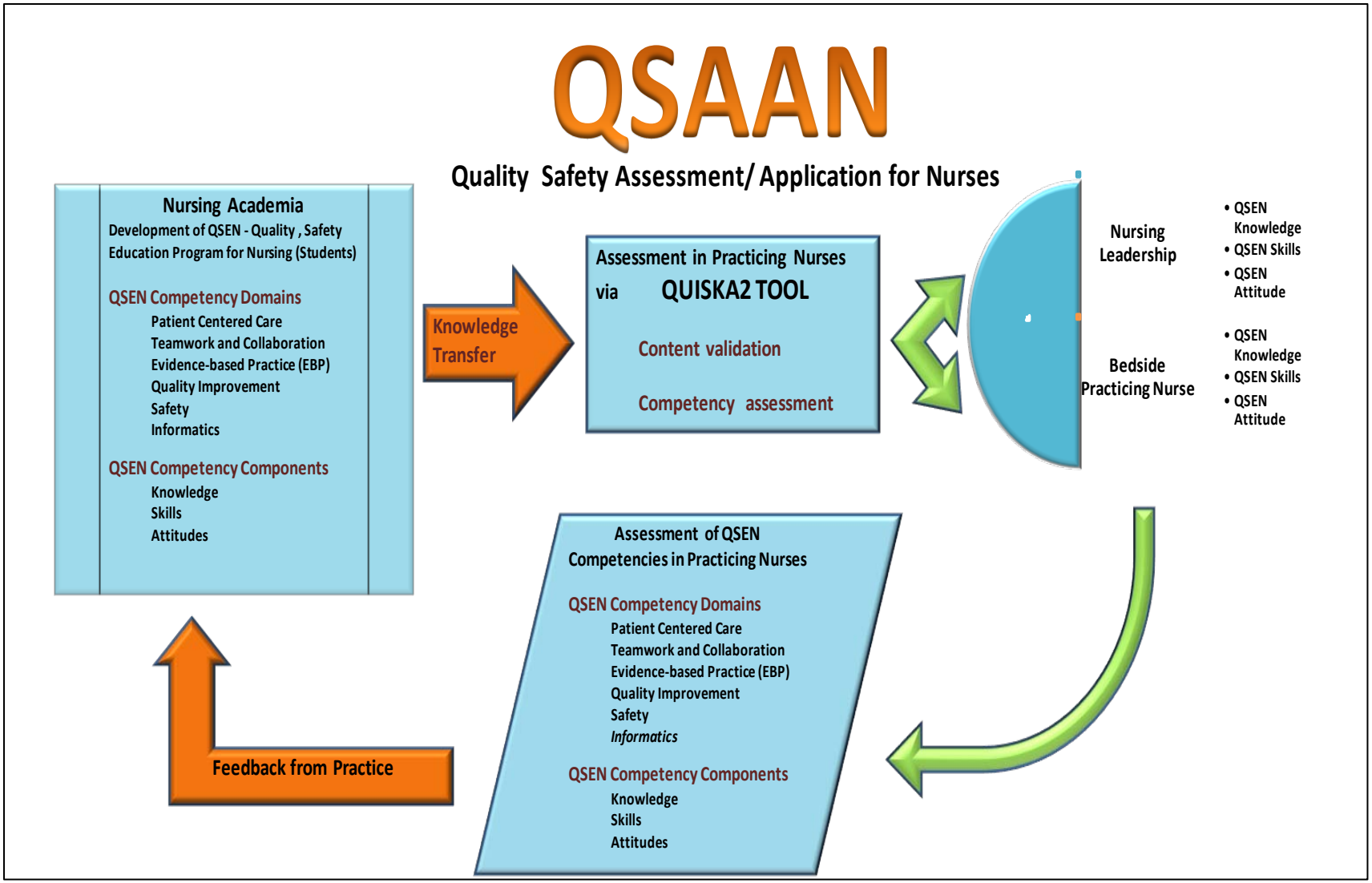

Figure G.1. QSAAN Conceptual Model

Appendix I, QSAAN Logic Model

Resources-Inputs	Activities	Outputs	Outcomes	Impacts
Get approval from Advisor & Preceptor for project	**Problem Recognition:** Identification of Quality/Safety Issue	Identification of lack of translation of recommended competencies in QSEN to practicing nurses	Identification of Project focuses to measure practicing nurse equivalency to QSEN model.	Alignment with Academia and Practice
Regis University Library resources	**Theoretical Underpinning:** Complete initial Literature Review, Systematic Review & Theoretical underpinning project	Identification of limited research on translation of QSEN to practice setting.	Identification of research and literature relevant to project.	Recognition of gap of nursing knowledge and identification of future nursing research opportunities
Pilot Class attendees –Quality-Safety	**Identification of Quality/Safety Issue:** Pilot course of quality safety for initial assessment baseline of knowledge of bedside practitioners.	Recognition of knowledge level of pilot group. Demonstration of feasibility to include education into project.	Identification that educational intervention was not effective in covering multiple components of QSEN to get full assessment of knowledge, skills and attitudes.	Future improvement initiatives can be developed based on outcome of assessment of practicing nurse knowledge.
South Denver EBP & Research Council IRB prep sub-committee	Submit research proposal for peer review prior to IRB approval.	Peer review and improved scholarly presentation	TBD – Scholarly document that meets all expectations of IRB	Improved scholarship of nursing research proposal will enable easier approval through hospital IRB boards.
Regis IRB, South Denver Adventist IRB, Saint Anthony Hospitals IRB	**Obtain IRB approval**	IRB presentations	IRB approval	Additional research to support growth of nursing knowledge.
Fiscal support for staff completion of research at work sites	**Budget Formation:** Develop draft budget for time and fiscal commitment for participating facilities	Draft budget for presentation to stakeholders at various facilities	Budget projection that can be used to promote project to foundational sources.	Identification of nursing research and the connection to patient safety will improve funding opportunities from foundations and grant sources.
Centura CNO Council – agreement for research in Denver facilities	**Presentation to Centura CNO Council:** Obtain support and agreement for research on all levels of nursing	Recognition of research opportunity for facilities. Recruitment of facilities for future research opportunities.	Approval and support for research initiative at the selected facilities.	Nursing professionalism includes the support and nurturing of nurses within the system. Professional development support will

	staff within Denver Centura facilities at CNO council meetings and nursing leadership meetings			include future research projects within the system.
Selected facility educators-research partners	**Presentation to Centura Professional Development Council:** Obtain support and agreement for on-site champion role at selected Denver facilities from either facility educators or nursing leader representative	Recognition of research opportunity for facilities. Recruitment of facilities for future research opportunities.	Support for research initiative at the selected facilities. Identification of champions at each facility.	Demonstration of professional development is a strong motivator and encourages others in leadership positions to seek additional opportunities for academic growth.
Selected facility Nursing Practice Councils – research champions	Participate in Nurse Practice Council meetings from various facilities and recruit practicing nurse champions and promote research participation	Recognition of research opportunity for facilities	Support for research initiative at the selected facilities Identification of champions at each facility.	Involvement of key stakeholders will provide recognition of leadership roles within this group. Awareness of research as a component of the job description will be enhanced in participation of the project.
Survey Monkey program with enhanced features.	Meet with Director of quality to assess ability to purchase extended package for Survey Monkey tool – with capability for SPSS downloads	Standardization of software programs.	Improved fiscal allocation and product functionality. Improved relationships between nursing and quality. Improved capabilities for statistical analysis of data collection via Survey Monkey tool.	Utilization of informatics and technology supported projects will enable greater efficiency and capabilities with projects.
SPSS analysis software	**Development of Evaluation Plan:** Evaluate facility software capacity and secure long-term access to statistical analysis program	Recognition of statistical analysis tools for nursing research capabilities.	Statistical package resource available to clinical researchers.	The recognition of statistics as a means for improving healthcare will be enhanced with demonstration of use within this project.
Statistical consultant	**Assessment for Statistical assistance:** Evaluate the feasibility and use of statistical consultant if needed outside of resources within South Denver EBP & Research Council	Development of relationship with statistician for future research initiatives.	Improved statistical analysis plan of research.	Expert consultants will be recognized as a component to research design.

Select assessment instrument to measure conceptual competencies in practicing nurse setting & obtain permission for use (Dycus and McKeon)	**Design of Survey:** Revise approved tool to apply to practicing nurses within acute care setting	Survey tool that applies to all levels of acute caring nursing.	Initial instrument for measuring entire QSEN competencies for acute care practicing nurse settings.	Future researchers can utilize the tool to expand the knowledge in this field.
Volunteer consultants	**Instrument Validation:** Perform content validity with designated nurses, QI, and test construction experts	Validation of instrument	Instrument validation and/or recommendations for improvements.	Validation of instruments will give greater credibility to research findings.
	Instrument Revision: Revise instrument based on expert validation recommendations	Completed instrument to measure QSEN competencies in practicing nurses.	Valid instrument	A valid instrument will improve the confidence of the researcher in the measurement of findings.
Nursing personnel at selected facilities	Conduct survey with all levels of nursing staff at designated facilities	Prospective research	Replicative prospective research on practicing nurses	Replication studies enrich and validate nursing science and expand the body of knowledge.
Selected site champions as designated facilities	**Monitoring of Implementation phase:** Maintain bi-weekly contact with site champions on progress of participation	Monitoring of completion rates	Greater participation rates	Improved participation rates will provide for decreased opportunities for limitations of the study and give credence to the research findings.

- Note – Areas bolded represented items on the timeline.

References:

Dycus, P., & McKeon, L. (2009). Using QSEN to measure quality and safety knowledge, skills, and attitudes of experienced pediatric oncology nurses: an international study. *Quality Management in Health Care*, 18(3), 202-208.

Appendix J, QSAAN Project Timeframe and Timeline

The QSAAN timeframe is designed to incorporate the components of the DNP Project Process Model. Each of the steps within the DNP Project Model is listed on the timeline. Under each step are the specific action steps that were completed in the course of the QSAAN project. The timeline also incorporated recognition of each semester of coursework and acknowledgment of completeness from planned, in-process to complete. Each action step also incorporated Donabedian's framework through the identification of each tactic as structure, process or outcomes (Donabedian, 1980). This reference to Donabedian's framework correlates to the application of structure, process and outcomes to the clinical practicum goals to support experiential learning activities to promote the QSAAN program. The timeframe of the QSAAN project can be viewed in Table J.1 The QSAAN project is meeting the expected timeline expectation with current activities in Step VII Implementation, Step IX Utilizing and Reporting Results and Step X Future Scholarship.

Table J.1

QSAAN DNP Capstone Project Timeline

✓	#	Task	9/10	10/10	11/10	12/10	1/11	2/11	3/11	4/11	5/11	6/11	7/11	8/11	9/11	10/11	11/11	12/11	1/12	2/12	3/12	4/12	5/12	Status	Category
	1	Step I: Problem Recognition																						Group	Group
		Identification of Quality/Safety Issue	D																					Done	Structure
		Complete Initial Literature Review	D																					Done	Structure
		Get Approval from Advisor	D																					Done	Structure
		Get approval from Preceptor	D																					Done	Structure
	2	Step II: Needs Assessment																						Group	Group
		Identification of Population		D							D													Done	Structure
		Identify sponsor & stakeholders	D																					Done	Process
		Organizational Assessment/ Pilot Class					D																	Done	Budget
		Assess available Resources					D	D	D															Done	Budget
		Desired outcomes							D	D	D	D												Done	Outcome
		Team Selection									D	D	D											Done	Structure
		Cost/Benefit Analysis										D	D	D										Done	Process
		Define scope of project										D	D	D										Done	Process
	3	Step III: Goals, Objectives, & Mission Statement																						Group	Group
		Goals												D	D									Done	Structure
		Process/outcome objectives												D	D									Done	Process
		Develop mission statement												D	D									Done	Structure
	4	Step IV: Theoretic Underpinnings																						Group	Group
		Theories of change	D	D																				Done	Structure
		Theories to support project framework	D	D																				Done	Structure
	5	Step V: Work Planning																						Group	Group
		Project Proposal												D	D	D	D							Done	Process
		Project Management tools									D	D	D											Done	Structure
		Milestone 1: Approval for tool								D														Done	Process
		Milestone 2: Approval from Advisor								D														Done	Process
		Milestone 3: Approval from Preceptor								D														Done	Process
		Milestone 4: Approval from Committee Chair									D													Done	Process
		Timeline								D	D													Done	Structure
		Budget Formation									D	D	D											Done	Process
		Grant submissions															D	D	D					Done	Process
		Presenation to South Denver EBP & Research Council											D	D	D	D	D	D	D	D				Done	Process
		Presentation to Centura CNO Council, CPDC											D	D			D			D				Done	Process
		Assessment for Statistical assistance												D			D							Done	Outcome
	6	Step VI: Planning for Evaluation																						Group	Group
		Instrument Revision									D	D												Done	Process
		Instrument Validation											D	D	D									Done	Process
		Instrument Revision II												D	D									Done	Process
		Design of Survey												D	D	D								Done	Process
		Development of Evaluation Plan												D	D	D	D							Done	Outcome
		Discussion with QSEN researchers															D							Done	
		Logic Model development												D	D	D	D	D						Done	Structure
	7	Step VII: Implementation																						Group	Group
		IRB Approval -Regis													D	D								Done	Process
		IRB Approval -South Denver Centura														D	D	D						Done	Process
		IRB Approval - Noth Denver Centura														D	D							Done	Process
		Threats and barriers													D	D								Done	Structure
		Monitoring of Implementation phase																D	D	D				Done	Process
		Project closure																		D	D	D	x	In Progress	Process
	8	Step VIII: Giving Meaning to the Data																						Group	Group
		Quantitative Data assessment																		D	D			Done	Outcome
	9	Step IX: Utilizing & Reporting Results																						Group	Group
		Written dissemination																					x	In Progress	Outcome
		Preparation of Abstracts																					D	Done	Outcome
		Oral dissemination to sites																					x	Planned	Outcome
	10	Future Scholarship																						Group	Group
		Expansion of survey sites																					x	Planned	Planned
		Bradley DNP Timeline, April 2012																							

Appendix K, QUISKA2 Survey Instrument

Demographic Table

Age	20-29	30-39	40-49	50-59	60 or older	
Gender	Female	Male				
Unit of Employment (a)	Medical/ Surgical	ICU/SDU	Perioperative services	Emergency Care	OB/GYN/ NICU	
Unit of Employment (b)	Pediatrics, Rehab, Psychiatry	Ambulatory	Support	Leadership		
Place of Employment	Hospital A	Hospital B	Hospital C	Hospital D		
Level of Nursing Education	Diploma	Associate	BSN	MS/MSN	Masters other field	Doctorate
National Certification such as OCN, CEN, CNOR etc. (not to include BLS, ACLS, TNCC, ENPC, etc)	Yes	No				
Year of graduation from nursing school	< 2 years	2-5years	6-10years	11-20years	>20years	
Previous Quality Improvement training	Yes	No				

Multiple Choice Questions
Please Circle the BEST answer to the following

1. Which of the following strategies can help nurses **learn** about the outcomes of care in their area of clinical practice?
   - **a. Collecting data on infection rates**
   - b. Monitoring staff satisfaction
   - c. Implementing an education plan
   - d. Discussing potential action plans with the surgeon

2. Understanding the source of practice variation is important because:
   - **a. it determines the type or action required**
   - b. it identifies the root cause of the problem
   - c. all variation, regardless of source, must be eliminated to achieve quality
   - d. it is the first step to increasing variation

3. Which source provides the strongest level of support for evidence-based practice?
   - **a. Meta analyses**
   - b. Randomized control trials
   - c. Hospital policy
   - d. Opinion of respected authorities

4. Evidence-based practice is defined as:
   a. promoting the publication of research findings among practicing nurses
   b. dissemination of research findings at conferences
   c. collecting data from subjects using measurement devices
   d. integrating best research practices with clinical expertise and patient values

5. A reliable source for locating clinical practice guidelines for a new chemotherapy protocol is:
   a. State Board of Nursing
   b. Internet nursing blog
   c. Nursing textbook
   d**. Oncology Nursing Society (ONS)**

6. If you were considering discussing the use of a new medication (Medication X) with physicians for post-op patients, what is your conclusion based on the studies listed below?

   a. ask the physicians to try the new drug
   b. postpone asking the physicians to try the new drug until further studies are conducted
   c. call the pharmaceutical firm to get more information about the drug.
   d. conduct your own study

Study	Design	Sample			Setting	Findings: Pain Relief
		Size	Age	Diagnosis		
Study A	Quasi-experimental	8	Peds	post-op thoracotomy	Community hospital	Medication X more effective than Morphine
Study B	Quasi-experimental	13	adult	Cancer-related Chronic pain	Out-pt	Medication X more effective than Morphine
Study C	Randomized control trial	52	Peds	trauma	Trauma-centers multi-site	Morphine more effective than Medication X

7. All of the following contribute to increased patient safety except:
   a. consideration of human factors processes in the design of medical devices and technology
   b. use of abbreviations for common medications
   c. systems and processes that limit or prevent workarounds
   d. computerized physician order entry (CPOE)

8. A potential drawback of using only automatic bed alarms to prevent falls
   a. not all nurses know how to use bed alarms
   b. other strategies to prevent falls may not be tried

c. families may not like the bed alarms
d. there are no drawbacks with bed alarms

9. All of the following elements are important for creating and sustaining a culture of healthcare safety except:
a. structures and systems that ensure an organization-wide awareness of patient safety performance gaps
b. job descriptions that require direct accountability of leaders, managers, and frontline caregivers for closing performance gaps in patient safety
c. leaders embrace a culture where safety and quality are openly discussed
d. staff are reprimanded when they make 2 or more medication errors within a 6 month period

10. Actions immediately following a near-miss medication error indicating a culture of safety include:
a. **congratulating the person that caught the error**
b. identifying how the error was detected
c. reprimanding the person who made the error
d. reporting the incident to the physician

11. Which of the following is an example of a culture of safety in a healthcare organization?
a. No more than 50% of the staff are agency
b. Near misses are reported
c. Nurses routinely work double shifts
d. Most patient transfers occur during shift change

12. Recently, a patient died as a result of an overdose of chemotherapy. Which tool can be used to help understand the causes of the error as well as allocation of responsibility and accountability?
a. Root cause analysis (RCA)
b. Failure Modes and Effects Analysis (FMEA)
c. Flow charting
d. Brainstorming

13. In which of the following scenarios is teamwork enhanced?
a. A nurse asks a colleague to decipher a poorly written medication order because she is afraid to call the ordering physician. .
b. The discharge planning team for a cystic fibrosis patient is led by the patient's respiratory therapist, who knows the most about the patient's condition.
c. A doctor orders chest restraints for a patient because of legal concerns despite the team's recommendations for 24 hour supervision without restraints.
d. A supervisor insists that a medical nursing team assume care for a critically ill patient because there is nowhere else for the patient to be admitted.

14. Strategies at the system level that facilitate effective team functioning include all of the following except:

a. Holding all unit meetings at 1 p.m.
b. Scheduling patient coverage for team members at meeting time
c. Sending emails to team with their "to do's" prior to the meeting
d. Training team leaders in communication

15. A team convenes to explore medication errors. An ineffective strategy to enhance team functioning would be to:
a. define the roles of all team members
b. develop ground rules for communication
c. **include as many staff members as possible on the team**
d. ensure that the meeting starts and ends on time

16. Which of the following examples **best** describes how technology and information management improve quality and safety in patient care?
a. a computerized physician order entry (CPOE) system that includes built in logic to check for oversights in drug selection and dosing
b. sections in the electronic medical record for narrative discussion rather than drop boxes or check boxes
c. distinct and separate sections for clinical disciplines to document in the electronic medical record that do not cross over.
d. identical data fields for all specialties

17. Which of the questions best informs the nurse of how a patient with chronic pain manages his/her comfort?
a. "You appear comfortable—you aren't in pain, are you?
b. "Wh**at is a tolerable level of pain for you?"**
c. "Is there medicine left in your bottle or do you need another prescription?"
d. What medicine do you take to eliminate your pain?"

18. Which of the following are common barriers related to patients and families becoming actively involved in the patient's health care processes?
a. cultural and religious beliefs
b. a paternalistic healthcare environment
c. a patient-centered care environment
d. open communication between healthcare providers, patient and family

19. An effective strategy to empower patients and families in health care processes is to:
a. Include patients and families in medical rounds
b. Invite patients to help other patients with similar diagnoses.
c. Request family members to call their insurer for a list of covered services
d. Ask patients/families when they would like to be discharged

20. Which of the following tools is beneficial for understanding steps of a process (such as medication administration)?
a. run chart

b. control chart
c. flow chart
d. Pareto chart

21. The following table shows 8 hospitals' ventilator associated pneumonia (VAP) rates per 1000 patient days for 2 consecutive years:

	VAP rate per 1000 patient days	
	2009	2010
Hospital A	4	5
Hospital B	8	7
Hospital C	10	8
Hospital D	9	9
Hospital E	5	5
Hospital F	3	4
Hospital G	2	4
Hospital H	1	0
VAP rate Mean	5.25	5.25
VAP rate Standard Deviation	3.37	2.8

The analysis of these data indicate that:
a. There is a data collection error in 2009.
b. The average VAP rate in 2009 was greater than 2010.
c. There is greater variability for VAP rate among hospitals in 2009.
d. Year 2009's performance for VAP is better than year 2010's.

22. Which of the following studies **best** measures patient outcomes?
a. nursing compliance with documentation of central line care
b. nursing compliance with the new medication policy
c. patient central line infection rate
d. frequency of crash cart logs documentation

23. Which of the following tools help understand process variation within ca clinical process such as the difference in the interval from the time from order to the first dose of an antibiotic?
a. Pareto chart
b. Pie chart
c. **Control chart**
d. Flow chart

24. The patient is scheduled to have a central line insertion completed in the radiology department this morning. The patient informs the nurse that he does not understand what the procedure is for because no one has told him about this before. The nurse's **best** response is:
a. tell the patient/family not to worry—the surgeon/radiologist does this particular procedure nearly every day

b. inform the patient that the procedure is routine with rare complications before signing the consent.
c. explain the procedure to the patient before having the consent form signed.
d. **request that the surgeon/radiologist explain the procedure to the patient to obtain consent for the procedure**.

25. When is it important to communicate to other healthcare providers the care that is needed by the patient?
a. only at shift-to-shift report
b. only at transfer to another facility
c. during lunch or other breaks
d. any time there is a transition of care of the patient

26. Standardized approaches to hand-off communication between caregivers, such as "Ticket to Ride" (eg.; I PASS the BATON, SBAR) :
a. are important because they provide an opportunity to ask and respond to questions.
b. are used mainly for lunch and other breaks to ensure that everything is communicated
c. are not effective for interdisciplinary hand-offs because providers communicate differently.
d. are used to solve system failures associated with patient hand-off.

Please Circle the Correct Answer—True or False

27. A good way to change a care process is to pilot the new process and evaluate the results before implementing changes in all areas/units of care. **True** False

28. Patient outcomes improve when healthcare providers know how to find, critically appraise, and incorporate evidence-based practice. True **False**

29. To be an effective member of a team, an individual must **first** understand the team's strengths, limitations, and values. **True** False

30. Nurses have expertise to devise electronic assessment tools because of their knowledge of patient care. **True** False

31. A barrier to using technology in healthcare is varying knowledge and experience of health care workers. **True** False

32. Patient coordination, integration, and continuity of care are only the responsibility of the case manager. True **False**

Rating Questions: Circle the correct response

Please rate your level of proficiency/skills with these process or terms listed in the sections below using the following scale

1 **Novice**—not familiar with and never used
2 **Familiar**—heard of the process/term but never used
3 **Understand**—understand the process/term and have used 1-2 times
4 **Skilled**--understanding of the process/term and have used 3-5 times
5 **Proficient**—understand the process/term and use 6-8 times in my work
6 **Expert**—understand the process/term and use >9 times in my work and am able to teach the concept to others

33. Team training 1 2 3 4 5 6
34. Assuming the role as team member 1 2 3 4 5 6
35. Assuming the role as team leader 1 2 3 4 5 6

36. Responding appropriately to clinical decision-making supports and alerts. 1 2 3 4 5 6
37. Using information technology to monitor outcomes of patient care 1 2 3 4 5 6

38. Patient Centered Care 1 2 3 4 5 6
39. Integrating religious and cultural values into the patient's plan of care 1 2 3 4 5 6

40. Process mapping or flowcharting 1 2 3 4 5 6
41. Quality improvement methodology such as Plan-Do-Check-Act or Six Sigma 1 2 3 4 5 6
42. Collecting data from retrospective or concurrent chart or record review 1 2 3 4 5 6

Graphical representation of data

43. Run charts 1 2 3 4 5 6
44. Control charts 1 2 3 4 5 6
45. Histograms 1 2 3 4 5 6
46. Pie charts 1 2 3 4 5 6
47. Pareto charts 1 2 3 4 5 6

Simple statistical analysis of data

48. Measures of central tendency—mean, median, mode 1 2 3 4 5 6
49. Standard deviation 1 2 3 4 5 6
50. Normal (Gaussian distribution) 1 2 3 4 5 6

More complex statistical analysis of data

51. t-test 1 2 3 4 5 6
52. Chi square 1 2 3 4 5 6
53. ANOVA 1 2 3 4 5 6
54. Regression analysis 1 2 3 4 5 6

55. Literature searches for relevant evidence-based practice 1 2 3 4 5 6
56. Critical appraisal of research studies 1 2 3 4 5 6
57. Putting current best practices or guidelines into my clinical practice 1 2 3 4 5 6

58. Error reporting systems 1 2 3 4 5 6
59. Root cause analysis (RCA) 1 2 3 4 5 6
60. Failure Modes & Effects Analysis (FMEA) 1 2 3 4 5 6
61. Electronic Medical Record (EMR) 1 2 3 4 5 6
62. Computerized Physician Order Entry (CPOE) 1 2 3 4 5 6

Please Circle your response
Use the following scale to answer the questions in this section: Rating scale for attitude questions: 1—not important at all 2---low importance 3---moderate importance 4---high importance
63. How important is it for nurses to participate in quality improvement projects? 1 2 3 4
64. How important is performance measurement is to improving patient outcomes? 1 2 3 4
65. How important is teamwork to improving patient outcomes and care? 1 2 3 4
66. How important is using evidence based practice to determine best clinical practice? 1 2 3 4
67. How important is reading current professional literature/journals to remain current with issues in clinical practice? 1 2 3 4
68. How important is standardization of processes and procedures to improving patient safety? 1 2 3 4
69. How important is teamwork, including interdisciplinary collaboration, to improving patient outcomes? 1 2 3 4
70. How important is it for nurses to be involved in the design, selection, implementation, and evaluation of information technologies to support patient care? 1 2 3 4
71. How important is it to include Patient Centered Care concepts (respecting patients' unique values and beliefs, patients'/families' active engagement in planning of care, patient family empowerment) in developing a plan of care for each patient? 1 2 3 4
72. How important is it to recognize that a patient's expectations regarding pain relief influence the success of the pain management plan? 1 2 3 4
73. How important is it to include the patients and their families in the development of a pain management plan of care? 1 2 3 4

Appendix L, Institutional Review Board Letters of Approval

RE: IRB proposal for DNP Regis Student - Bradley

Institutional Review Board

Sent: Wednesday, October 26, 2011 1:00 PM

To: Schreiber, Valerie; Bradley, Kathleen

Cc: Claywell, Lora G.; Gilbert, Marcia a.

Attachments: IRB_Application_Form_A_Bra~1.doc (167 KB)

Kathleen, your study entitled "Quality Safety Assessment/Application for Nurses ($QSAN^2$):Translation of QSEN Competencies in the Practice Setting" is approved as an exempt study under 45CFR46.101(b)(1 & 2) (instructional strategies & survey research). A consent form is not required for exempt studies, but a statement of consent on the opening page of the survey is suggested.

I appreciate the preparation you have put into this project and hope that you have a good response rate from the target audience. My best wishes on the completion of your study.

Daniel

Carpe niceterium,

Daniel Roysden, Ph.D., Regis University IRB Chair
Assistant Professor
Regis University
Department of Health Care Ethics
Reukert-Hartman College for Health Professions
3333 Regis BLVD, Mail Code G-5
Denver, CO 80221

Addendum to Regis IRB October 19th, 2011 for addition of Julie Benz as ST. Anthony site PI

Porter Adventist Hospital

Centura Health

Joint IRB Office
2525 South Downing Street
Denver, Colorado 80210-5876
Phone: 303-778-2554
Fax: 303-778-5650

Wednesday, November 09, 2011

Kathleen Bradley, R.N.

2525 S. Downing St.
Denver, CO 80210

RE: Study Number 1381

Quality Safety Assessment/Application for Nurses (QSAAN): Translation of QSEN Competencies in the Practice setting.

NEW PROTOCOL Expedited:
Cover letter dated October 14, 2011 requesting expedited review of this proposed research. An exemption from continuing review is being requested. Included in the submission find:

- The Project Determination Form
- Exempt application
- Protocol (QSAAN_Bradley)
- Letter of recommendation dated October 12, 2010
- NIH, CITI and CV for Principal Investigator

Dear Ms. Bradley:

This letter is to inform you of the action taken by the Porter, Littleton and Parker Joint IRB regarding the above-mentioned submission.

The board's action is as follows:

Action: Approval (Expedited Review) **This action occurred on:** 11/8/2011

Recusing/abstaining member(s): None.

Stipulations: *None.*

Recommendations/Comments: Thank you for your submission. This study has received approval and is exempt from continuing review.

Research Sites:	Porter Adventist Hospital	Littleton Adventist Hospital	Parker Adventist Hospital

Sub-Investigators: None.

Porter Adventist Hospital
Centura Health.

Joint IRB Office
2525 South Downing Street
Denver, Colorado 80210-5876
Phone: 303-778-2554
Fax: 303-778-5650

Study #: 1381 **Principal Investigator:** Kathleen Bradley, R.N.

Initial Approval Date: 10/26/2011 **Expiration Date:** 10/25/2012 **Review Interval:** Exempt

Investigator Information/Responsibilities

1. Continuing review - providing among other things, an update on the progress of the study and any new information that has come to light since the inception of the study is required. The review must occur within 1 year (or sooner if designated by the IRB) from the anniversary date of the convened meeting at which the IRB reviewed and approved the protocol. You must submit your report at least 45 days before the expiration date to give the IRB adequate time to review the report, and avoid a lapse in approval. If the approval expires, cease enrollment until approval is given by the fully convened IRB. The study expiration date is referenced above, and is included on responses sent from the IRB office. Please be cognizant of your expiration date. You may also receive a reminder notification from the IRB office prior to the expiration date.

2. You are required, at all times during this research, to promptly report to the Board any changes in research activity, unanticipated problems in the research, adverse events, or scientific misconduct involving risks to subjects or others.

3. You must refrain from initiating changes in this approved research without first obtaining the Board's review and approval. This includes study advertisements, and minor changes to any protocol documents or consent forms (you must use the stamped IRB approved consent form). Pre-approval is not required where the initiation of a research change is necessary to eliminate apparent immediate hazard to human subjects. Failure to comply with these obligations may result in the termination of the Board's approval of this research.

4. All future submissions must include a cover letter with the IRB study number, full study title, investigator name, a detailed description, and a summary of changes for all revisions.

5. Research study participant records (only for studies where Centura is a designated site or studies conducted by Centura-employed physicians) shall keep records of experimental drugs and devices 30 years after date of experiment (medical record must also be retained); Non-drug and device records shall be kept 10 years after date of research

6. The Porter, Littleton and Parker JOINT IRB is organized and operates according to the ICH Good Clinical Practice guidance, complies with applicable laws, and regulation as described in [21 CFR Parts 50, 56] & [45 CFR 46].

Melody Rael

Digitally signed by Melody Rael
DN: cn=Melody Rael, o=Porter Adventist Hospital, ou=Institutional Review Board, email=melodyrael@centura.org, c=US
Date: 2011.11.09 16:16:44 -07'00'

Melody Rael
Porter and Littleton Adventist Hospitals
Joint IRB Manager

Figure L.1 Porter, Littleton, Parker Joint IRB Approval Letter

(A)

St. Anthony Hospital
Centura Health

Institutional Review Board

St. Anthony Hospital
11600 W. 2nd Place
Lakewood, CO. 80228
Phone: 720.321.1720
Fax: 720.321.1711

MEMO

Date: 10/25/2011

To: Patrick Offner, MD

From: Jamie Gray

RE: Review Request

Study #SAH1239
Quality Safety Assessment/Application for Nurses (QSAAN): Translation of QSEN Competencies in the Practice Setting
Julie Benz, MD, Principal Investigator

INITIAL EXEMPT STUDY SUBMISSION:

Attachments:
- Cover letter dated 10/19/2011
- Letter to commitment from Julie Benz
- Letter of support from Sharon Pappas
- Submission Checklist
- Project Determination Form
- Exempt Application
- Request for Waiver of Auth for use or disclosure of PHI
- Request for waiver of some of the elements of consent
- Research Impact statements
- Financial Disclosure, Evidence of Competency, CV and training information for Site PI - Julie Benz
- Financial Disclosure, Evidence of Competency, CV and training information for Student PI - Kathleen Bradley
- Protocol / Consent document
- Request for Fee Waiver - No External funding.

For any questions or concerns, please call 720-321-1720. Thank you!

Recommendations:

☒ **Exempt – Category # 2** ☐ **Expedited - Category #** ☐ **Full Board**

☒ Approve (without modifications) ☐ Approve Study Closure ☐ Noted
☐ Modifications required: _____
☐ Defer to full board for review, pending the following information: _____
☐ Disapprove

If applicable, address the following:

Revision Date: 06/01/2011

Continuing review interval: ☐ 12-months ☐ 6-months ☐ Other: _____
If review fee waiver was requested ☐ Approve ☐ Deny

Chair/Designee Signature

10/27/11
Date

Figure L.2, St. Anthony Hospital IRB Approval Letter

Appendix M, Collaborative Institutional Training Initiative Training (CITI) Certificate

CITI Collaborative Institutional Training Initiative

Human Research Curriculum Completion Report
Printed on 6/4/2011

Learner: Kathleen Bradley (username: bradl412)
Institution: Regis University
Contact Information Department: Nursing
Email: bradl412@regis.edu

Social Behavioral Research Investigators and Key Personnel:

Stage 1. Basic Course Passed on 06/04/11 (Ref # 6126309)

Required Modules	Date Completed	
Introduction	06/04/11	no quiz
History and Ethical Principles - SBR	06/04/11	4/4 (100%)
The Regulations and The Social and Behavioral Sciences - SBR	06/04/11	5/5 (100%)
Assessing Risk in Social and Behavioral Sciences - SBR	06/04/11	5/5 (100%)
Informed Consent - SBR	06/04/11	5/5 (100%)
Privacy and Confidentiality - SBR	06/04/11	5/5 (100%)
Regis University	06/04/11	no quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI participating institution. Falsified information and unauthorized use of the CITI course site is unethical, and may be considered scientific misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Course Coordinator

Appendix N, Nation Institute of Health (NIH) Training Certificate

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research

certifies that

Kathleen Bradley successfully completed

the NIH Web-based training course

"Protecting Human Research Participants".

Date of completion: 01/24/2010

Certification Number: 371364

Appendix O, Letters of Support from Participating Facility Chief Nursing Officers

Porter Adventist Hospital
Centura Health.

Administration
2525 S. Downing Street
Denver, Colorado 80210

October 12, 2011

Institutional Review Board:

This is to verify the support of the study *Quality Safety Assessment/Application for Nurses* performed by Kathleen Bradley, RN, MSN, NEA-BC in the acute care facilities of Centura Health. Thank you for providing this opportunity to participate in innovative research.

This letter acknowledges my understanding of and permission for Kathleen Bradley, RN, MSN, NEA-BC to submit her proposed capstone project to the Regis University, Lowell Campus Institutional Review Board (IRB). Following approval and in accordance with all other institutional IRBs, policies and procedures impacted in any way by her research, I will support her in the completion of her project to the best of my ability.

Ms Bradley clearly demonstrates the knowledge and skill set required to complete her proposed project while assuring human subjects are protected according to the principles of research with human subjects (45 CFR 46) and the strong ethical principles she and the University require at all times.

Feel free to contact me if you have any questions or need additional clarification of support. Thank you for supporting Ms Bradley in this exciting venture!

Sincerely,

Sharon Pappas, RN, PhD, NEA-BC
Chief Nursing Officer, Porter Adventist Hospital
Chief Nurse Executive, Centura Health

Figure O.1, Letter of Support Dr. Sharon Pappas, CNO Porter Adventist Hospital

Parker Adventist Hospital
Centura Health.

9395 Crown Crest Blvd.
Parker, CO 80138
303.269.4015 Phone
parkerhospital.org

March 26, 2012

Institutional Review Board:

This is to verify the support of the study *Quality Safety Assessment/Application for Nurses* performed by Kathleen Bradley, RN, MSN, NEA-BC in the acute care facilities of Parker Adventist Hospital. Thank you for providing this opportunity to participate in innovative research.

This letter acknowledges understanding of and permission for Kathleen Bradley, RN, MSN, NEA-BC to submit her proposed capstone project to the Regis University, Lowell Campus Institutional Review Board (IRB). Following approval and in accordance with all other institutional IRBs, policies and procedures impacted in any way by her research, I will support her in the completion of her project to the best of my ability.

Ms Bradley clearly demonstrates the knowledge and skill set required to complete her proposed project while assuring human subjects are protected according to the principles of research with human subjects (45 CFR 46) and the strong ethical principles she and the University require at all times.

Feel free to contact me if you have any questions or need additional clarification of support. Thank you for supporting Ms Bradley in this exciting venture!

Sincerely,

Holly Fedak

Holly Fedak, RN, MBA, FACHE, NEA-BC
Chief Nursing Office / VP Patient Care Services
Parker Adventist Hospital
9395 Crown Crest Boulevard
Parker, Colorado 80138

Figure O.2, Letter of Support Holly Fedak, CNO Parker Adventist Hospital

Littleton Adventist Hospital

7700 S. Broadway
Littleton, CO 80122
mylittletonhospital.org

Patient Experience

March 26, 2012

Institutional Review Board:

This is to verify the support of the study *Quality Safety Assessment/Application for Nurses* performed by Kathleen Bradley, RN, MSN, NEA-BC, in the acute care facilities of Centura Health. Thank you for providing this opportunity to participate in innovative research.

This letter acknowledges my understanding of and permission for Kathleen Bradley, RN, MSN, NEA-BC, to submit her proposed capstone project to the Regis University, Lowell Campus Institutional Review Board (IRB). Following approval and in accordance with all other institutional IRBs, policies and procedures impacted in any way by her research, I will support her in the completion of her project to the best of my ability.

Ms. Bradley clearly demonstrates the knowledge and skill set required to complete her proposed project while assuring human subjects are protected according to the principles of research with human subjects (45 CFR 46) and the strong ethical principles she and the university require at all times.

Feel free to contact me if you have any questions or need additional clarification of support. Thank you for supporting Ms. Bradley in this exciting venture.

Sincerely,

Rhonda Ward

Rhonda Ward, RN, MSN, NEA-BC
Chief Nursing Officer

Figure O.3, Letter of Support Rhonda Ward, CNO Littleton Adventist Hospital

St. Anthony Hospital
Centura Health

11600 W 2nd Place
Lakewood, CO 80228
720-321-0000
stanthonyhosp.org

March 23, 2012

Institutional Review Board:

This is to verify the support of the study *Quality Safety Assessment/Application for Nurses* performed by Kathleen Bradley, RN, MSN, NEA-BC in the acute care facilities of Centura Health. Thank you for providing this opportunity to participate in innovative research.

This letter acknowledges my understanding of and permission for Kathleen Bradley, RN, MSN, NEA-BC to submit her proposed capstone project to the Regis University, Lowell Campus Institutional Review Board (IRB). Following approval and in accordance with all other institutional IRBs, policies and procedures impacted in any way by her research, I will support her in the completion of her project to the best of my ability.

Ms. Bradley clearly demonstrates the knowledge and skill set required to complete her proposed project while assuring human subjects are protected according to the principles of research with human subjects (45 CFR 46) and the strong ethical principles she and the University require at all times.

Feel free to contact me if you have any questions or need additional clarification of support. Thank you for supporting Ms. Bradley in this exciting venture!

Sincerely,

Patti Thompson, RN

Patti Thompson, MBA, RN
Interim Chief Nursing Officer, St. Anthony Hospital

Figure O.4, Letter of Support Patti Thompson, Interim Chief Nursing Officer, St. Anthony Hospital

Appendix P, Participant Demographic Data

Table P.1

Participant Demographic Data

Participant Demographic Data (N=366)		
Demographic Variable	**%**	**(n)**
Female	91.5	(335)
Age		
20-29	11.2	(41)
30-39	20.5	(75)
40-49	20.8	(76)
50-59	36.1	(132)
60 or older	11.5	(42)
Unit of Work		
Medical - Surgical	25.4	(93)
ICU/ SDU	17.8	(65)
Perioperative	13.1	(48)
Emergency	9.8	(36)
OB/GYN/NICU	6.6	(24)
Pediatrics/ Rehab/ Psychiatric	5.5	(20)
Ambulatory	6.6	(24)
Support/ QI/ Education/ CM	6.6	(24)
Leadership	8.7	(32)
Hospital		
A	15.3	(56)
B	31.4	(115)
C	21.6	(79)
D	31.7	(116)
Nursing Role		
Direct Care Nurse	64.2	(235)
ANM/ Manager/ CC/ Educator	28.1	(103)
Nurse Executive /CNO / APRN	7.7	(28)
Level of Education		
Diploma	4.9	(18)
Associate	21.3	(78)
BSN	54.9	(201)
MS/MSN	13.4	(49)
Masters in another field	3.8	(14)
Doctorate	1.6	(6)
Certification		
Yes	50.0	(183)

Years from Nursing School		
<2 years	4.4	(16)
2-5 years	13.4	(49)
6-10 years	16.4	(60)
11-20 years	20.2	(74)
>20 years	45.6	(167)
Previous QI Education		
Yes	51.1	(187)

Abbreviations: ANM, assistant nurse manager; APRN, advanced practice registered nurse; BSN, bachelor of science in nursing; CM, Case Management; CNO, Chief Nursing Officer; GYN, Gynecology ICU, Intensive Care Unit; MS, master of science; MSN, master of science in nursing; NICU, Neonate Intensive Care Unit OB, Obstetrics; QI Quality Improvement; RN, registered nurse; SDU, Step Down Unit.

Appendix Q, Internal Consistency Tables

Table Q.1

Reliability Statistics Overall KSA

Reliability Statistics - Overall- KSA

Cronbach's Alpha	N of Items
.940	73

Table Q.2

ANOVA Overall KSA

ANOVA with Cochran's Test -Overall - KSA

		Sum of Squares	df	Mean Square	Cochran's Q	Sig
Between People		3872.340	365	10.609		
	Between Items	54294.598	72	754.092	20121.489	.000
Within People	Residual	16812.032	26280	.640		
	Total	71106.630	26352	2.698		
Total		74978.970	26717	2.806		

Grand Mean = 2.16

Table Q.3

Correlation Coefficient Overall KSA

Intraclass Correlation Coefficient - Overall - KSA

	Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.176[a]	.155	.200	16.584	365	26280	.000
Average Measures	.940[c]	.931	.948	16.584	365	26280	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Nursing Role Specific Overall KSA

Table Q.4

Frequency Statistics Overall KSA- Nursing Role

Scale Statistics- Overall - KSA

NRROL Nursing Role	Mean	Variance	Std. Deviation	N of Items
1- Direct Care	151.26	614.225	24.784	73
2 - Front Line Leader	161.90	745.049	27.296	71
3 - Nurse Executive	175.82	686.078	26.193	64

Table Q.5

Reliability Statistics Overall KSA- Nursing Role

Reliability Statistics - Nursing Role - Overall KSA

NRROL Nursing Role	Cronbach's Alpha	N of Items
1- Direct Care	.927	73
2 - Front Line Leader	.941	73
3 - Nurse Executive	.939	73

Table Q.6

ANOVA Overall KSA - Nursing Role

ANOVA with Cochran's Test - Overall KSA

NRROL Nursing Role			Sum of Squares	df	Mean Square	Cochran's Q	Sig
1 - Direct Care	Between People		1968.886	234	8.414		
	Within People	Between Items	33123.036	72	460.042	12880.993	.000
		Residual	10386.169	16848	.616		
		Total	43509.205	16920	2.571		
	Total		45478.092	17154	2.651		
2- Front Line Leader	Between People		1070.353	102	10.494		
	Within People	Between Items	15974.329	70	228.205	5648.879	.000
		Residual	4414.657	7140	.618		
		Total	20388.986	7210	2.828		
	Total		21459.338	7312	2.935		

3 - Nurse Executive	Between People		289.439	27	10.720		
	Within People	Between Items	5090.307	63	80.799	1456.486	.000
		Residual	1074.739	1701	.632		
		Total	6165.047	1764	3.495		
	Total		6454.486	1791	3.604		

Grand Mean = 2.75

Table Q.7

Correlation Coefficient Overall KSA- Nursing Role

Intraclass Correlation Coefficient - Overall KSA

NRROL Nursing Role		Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
			Lower Bound	Upper Bound	Value	df1	df2	Sig
1 Direct Care	Single Measures	.148[a]	.125	.175	13.649	234	16848	.000
	Average Measures	.927[c]	.913	.939	13.649	234	16848	.000
2 Front Line Leader	Single Measures	.184[a]	.146	.235	16.972	102	7140	.000
	Average Measures	.941[c]	.924	.956	16.972	102	7140	.000
3 Nurse Executive	Single Measures	.200[a]	.130	.323	16.967	27	1701	.000
	Average Measures	.941[c]	.905	.968	16.967	27	1701	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Knowledge Reliability Subset - Overall Participants

Table Q.8

Reliability Statistics Knowledge

Reliability Statistics - Overall Knowledge

Cronbach's Alpha	N of Items
.608	32

Table Q.9

ANOVA Overall Knowledge

ANOVA with Cochran's Test - Overall Knowledge

		Sum of Squares	df	Mean Square	Cochran's Q	Sig
Between People		125.879	365	.345		
	Between Items	480.975	31	15.515	2711.583	.000
Within People	Residual	1531.556	11315	.135		
	Total	2012.531	11346	.177		
Total		2138.410	11711	.183		

Grand Mean = .76

Table Q.10

Correlation Coefficient Overall Knowledge

Intraclass Correlation Coefficient - Overall Knowledge

	Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.046[a]	.036	.058	2.548	365	11315	.000
Average Measures	.608[c]	.547	.663	2.548	365	11315	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Knowledge Subset with Nursing Role - all multiple choice and true/ false questions

Table Q.11

Reliability Statistics Knowledge- Nursing Role

Reliability Statistics - Nursing Role - Knowledge

NRROL Nursing Role	Cronbach's Alpha	N of Items
1- Direct Care	.577	32
2 - Front Line Leader	.618	32
3 - Nurse Executive	.491	32

Table Q.12

ANOVA Overall Knowledge- Nursing Role

ANOVA with Cochran's Test - Nursing Role - Knowledge

NRROL Nursing Role			Sum of Squares	df	Mean Square	Cochran's Q	Sig
1 Direct Care	Between People		78.523	234	.336		
	Within People	Between Items	334.965	31	10.805	1787.256	.000
		Residual	1030.379	7254	.142		
		Total	1365.344	7285	.187		
	Total		1443.867	7519	.192		
2 Front Line Leader	Between People		33.541	102	.329		
	Within People	Between Items	120.468	31	3.886	743.698	.000
		Residual	396.751	3162	.125		
		Total	517.219	3193	.162		
	Total		550.759	3295	.167		
3 Nurse Executive	Between People		5.905	27	.219		
	Within People	Between Items	36.838	31	1.188	246.025	.000
		Residual	93.131	837	.111		
		Total	129.969	868	.150		
	Total		135.874	895	.152		
Grand Mean = .81							

Table Q.13

Correlation Coefficient Overall Knowledge - Nursing Role

Intraclass Correlation Coefficient - Nursing Role - Knowledge

NRROL Nursing Role		Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
			Lower Bound	Upper Bound	Value	df1	df2	Sig
1 Direct Care	Single Measures	.041[a]	.030	.055	2.362	234	7254	.000
	Average Measures	.577[c]	.495	.651	2.362	234	7254	.000
2 Front Line Leader	Single Measures	.048[a]	.031	.073	2.621	102	3162	.000
	Average Measures	.618[c]	.504	.717	2.621	102	3162	.000
3 Nurse Executive	Single Measures	.029[a]	.007	.077	1.966	27	837	.002
	Average Measures	.491[c]	.177	.727	1.966	27	837	.002

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Knowledge Subset with Nursing Role - with 17 multiple choice

Table Q.14

Reliability Statistics Knowledge Subset 17 Questions

Reliability Statistics- Overall - Knowledge (a)

Cronbach's Alpha	N of Items
.277	17

Table Q.15

ANOVA Overall Knowledge Subset17 Questions

ANOVA with Cochran's Test -- Overall - Knowledge (a)

		Sum of Squares	df	Mean Square	Cochran's Q	Sig
Between People		70.124	365	.192		
	Between Items	353.538	16	22.096	1777.188	.000
Within People	Residual	811.403	5840	.139		
	Total	1164.941	5856	.199		
Total		1235.065	6221	.199		

Grand Mean = .73

Table Q.16

Correlation Coefficient Overall Knowledge - Subset 17 Questions

Intraclass Correlation Coefficient- Overall - Knowledge (a)

	Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.022[a]	.011	.035	1.383	365	5840	.000
Average Measures	.277[c]	.164	.381	1.383	365	5840	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Knowledge Subset with Nursing Role - 17 Questions

Table Q.17

Reliability Statistics Overall Knowledge Subset- (17 Q) Nursing Role

Reliability Statistics- Nursing Role - Knowledge (a)

NRROL Nursing Role	Cronbach's Alpha[a]	N of Items
1- Direct Care	.174	17
2 - Front Line Leader	.417	17
3 - Nurse Executive	-.021	17

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

Table Q.18

ANOVA Overall Knowledge Subset- (17Q) Nursing Role

ANOVA with Cochran's Test - Nursing Role - Knowledge (a)

NRROL Nursing Role			Sum of Squares	df	Mean Square	Cochran's Q	Sig
1 - Direct Care	Between People		40.892	234	.175		
	Within People	Between Items	242.441	16	15.153	1164.648	.000
		Residual	540.265	3744	.144		
		Total	782.706	3760	.208		
	Total		823.598	3994	.206		
2- Front Line Leader	Between People		22.343	102	.219		
	Within People	Between Items	89.920	16	5.620	496.492	.000
		Residual	208.551	1632	.128		
		Total	298.471	1648	.181		
	Total		320.813	1750	.183		
3 - Nurse Executive	Between People		3.452	27	.128		
	Within People	Between Items	27.395	16	1.712	146.517	.000
		Residual	56.370	432	.130		
		Total	83.765	448	.187		
	Total		87.216	475	.184		

Grand Mean = .76

Table Q.19

Correlation Coefficient Overall Knowledge - Subset - Nursing Role

Intraclass Correlation Coefficient - Nursing Role - Knowledge (a)

NRROL Nursing Role		Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
			Lower Bound	Upper Bound	Value	df1	df2	Sig
1 Direct Care	Single Measures	.012[a]	.001	.027	1.211	234	3744	.018
	Average Measures	.174[c]	.012	.321	1.211	234	3744	.018
2 Front Line Leader	Single Measures	.040[a]	.018	.072	1.714	102	1632	.000
	Average Measures	.417[c]	.239	.569	1.714	102	1632	.000
3 Nurse Executive	Single Measures	-.001[a]	-.024	.047	.980	27	432	.496
	Average Measures	-.021[c]	-.667	.456	.980	27	432	.496

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Skill Reliability Subset - Overall Participants

Table Q.20

Reliability Statistics Overall Skills Subset

Reliability Statistics - Overall - Skills

Cronbach's Alpha	N of Items
.945	45

Table Q.21

ANOVA Overall Skills Subset

ANOVA with Cochran's Test - Overall - Skills

		Sum of Squares	df	Mean Square	Cochran's Q	Sig
Between People		5567.432	365	15.253		
	Between Items	30152.305	44	685.280	11157.006	.000
Within People	Residual	13369.472	16060	.832		
	Total	43521.778	16104	2.703		
Total		49089.210	16469	2.981		

Grand Mean = 2.31

Table Q.22

Correlation Coefficient Overall Skills- Subset

Intraclass Correlation Coefficient- Overall - Skills

	Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.278[a]	.249	.311	18.323	365	16060	.000
Average Measures	.945[c]	.937	.953	18.323	365	16060	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Skill Subset with Nursing Role

Table Q.23

Reliability Statistics Overall Skills Subset - Nursing Role

Reliability Statistics- Nursing Role - Skills

NRROL Nursing Role	Cronbach's Alpha	N of Items
1- Direct Care	.933	45
2 - Front Line Leader	.948	45
3 - Nurse Executive	.946	45

Table Q.24

ANOVA Overall Skills Subset- Nursing Role

ANOVA with Cochran's Test- Nursing Role - Skills

NRROL Nursing Role			Sum of Squares	df	Mean Square	Cochran's Q	Sig
1 Direct Care	Between People		2811.954	234	12.017		
	Within People	Between Items	18147.731	44	412.448	7094.973	.000
		Residual	8300.224	10296	.806		
		Total	26447.956	10340	2.558		
	Total		29259.910	10574	2.767		
2 Front Line Leader	Between People		1554.965	102	15.245		
	Within People	Between Items	9278.696	44	210.879	3282.195	.000
		Residual	3533.171	4488	.787		
		Total	12811.867	4532	2.827		
	Total		14366.831	4634	3.100		
3 Nurse Executive	Between People		381.994	27	14.148		
	Within People	Between Items	3358.092	44	76.320	970.721	.000
		Residual	903.863	1188	.761		
		Total	4261.956	1232	3.459		
	Total		4643.949	1259	3.689		
Grand Mean = 2.99							

Table Q.25

Correlation Coefficient Overall Skills- Subset- Nursing Role

Intraclass Correlation Coefficient- Nursing Role - Skills

	Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.278[a]	.249	.311	18.323	365	16060	.000
Average Measures	.945[c]	.937	.953	18.323	365	16060	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Attitude Reliability Subset - Overall Participants

Table Q.26

Reliability Statistics Overall Attitude Subset

Reliability Statistics- Overall - Attitude

Cronbach's Alpha	N of Items
.910	11

Table Q.27

ANOVA Overall Attitude Subset

ANOVA with Cochran's Test -- Overall - Attitude

		Sum of Squares	df	Mean Square	Cochran's Q	Sig
Between People		455.132	365	1.247		
	Between Items	39.192	10	3.919	318.760	.000
Within People	Residual	410.808	3650	.113		
	Total	450.000	3660	.123		
Total		905.132	4025	.225		

Grand Mean = 3.78

Table Q.28

Correlation Coefficient Overall Attitude Subset-

Intraclass Correlation Coefficient-- Overall - Attitude

	Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.478[a]	.438	.521	11.079	365	3650	.000
Average Measures	.910[c]	.895	.923	11.079	365	3650	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Attitude Subset with Nursing Role

Table Q.29

Reliability Statistics Overall Attitude Subset- Nursing Role

Reliability Statistics - Nursing Role - Attitude

NRROL Nursing Role	Cronbach's Alpha	N of Items
1- Direct Care	.924	11
2 - Front Line Leader	.815	11
3 - Nurse Executive	.682	11

Table Q.30

ANOVA Overall Attitude Subset- Nursing Role

ANOVA with Cochran's Test- Nursing Role - Attitude

NRROL Nursing Role			Sum of Squares	df	Mean Square	Cochran's Q	Sig
1 Direct Care	Between People		375.232	234	1.604		
	Within People	Between Items	29.876	10	2.988	221.925	.000
		Residual	286.487	2340	.122		
		Total	316.364	2350	.135		
	Total		691.595	2584	.268		
2 Front Line Leader	Between People		58.155	102	.570		
	Within People	Between Items	9.811	10	.981	85.904	.000
		Residual	107.825	1020	.106		
		Total	117.636	1030	.114		
	Total		175.792	1132	.155		
3 Nurse Executive	Between People		4.429	27	.164		
	Within People	Between Items	1.929	10	.193	33.750	.000
		Residual	14.071	270	.052		
		Total	16.000	280	.057		
	Total		20.429	307	.067		
Grand Mean = 3.93							

Table Q.31

Correlation Coefficient Overall Attitude Subset- Nursing Role

Intraclass Correlation Coefficient - Nursing Role - Attitude

NRROL Nursing Role		Intraclass Correlation[b]	95% Confidence Interval		F Test with True Value 0			
			Lower Bound	Upper Bound	Value	df1	df2	Sig
1 Direct Care	Single Measures	.524[a]	.474	.576	13.098	234	2340	.000
	Average Measures	.924[c]	.908	.937	13.098	234	2340	.000
2 Front Line Leader	Single Measures	.285[a]	.220	.365	5.393	102	1020	.000
	Average Measures	.815[c]	.757	.864	5.393	102	1020	.000
3 Nurse Executive	Single Measures	.163[a]	.076	.310	3.147	27	270	.000
	Average Measures	.682[c]	.475	.832	3.147	27	270	.000

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same, whether the interaction effect is present or not.

b. Type C intraclass correlation coefficients using a consistency definition-the between-measure variance is excluded from the denominator variance.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Appendix R, Varimax and Sorted Factor Structure Matrix Tables

Table R.1

Overall QUISKA2 Factor Analysis

Overall QUISKA2 Factor Analysis (n = 366)				
		Factor		
		1	2	3
QSEN Domain	**QUISKA2 Questions**			
QI	Root cause analysis	**1.106**	-.071	-.112
QI	Graphical representation of data on control charts	.988	-.370	-.292
EBP	Literature searches for relevant EBP	**1.042**	.034	.537
EBP	Simple statistical analysis of data standard deviation	**1.002**	-.393	.292
QI	Graphical representation of data on run charts	**.955**	-.360	-.343
QI	Data collection: retrospective chart review	**1.195**	.387	-.380
QI	Graphical representation of data on histogram	**.971**	-.413	-.182
QI	Quality improvement methodology: PDCA/Six Sigma	**1.173**	.122	-.573
QI	Failure Mode and Effects Analysis	**.989**	-.194	-.263
EBP	Critical appraisal of research studies	**.988**	-.103	.505
QI	Process mapping or flowcharting	**1.046**	.249	-.356
QI	Graphical representation of data on Pareto charts	**.917**	-.382	-.333
QI	Error reporting system	**.918**	.223	.185
EBP	Simple statistics: mean, median, mode	**1.016**	-.408	.426
EBP	Applying current best practice/ guidelines	**.869**	.310	.436
QI	Graphical representation of data on PIE CHART	**.963**	-.246	-.015
EBP	Simple statistical analysis data (Gaussian curve)	**.917**	-.489	.090
EBP	More complex statistical analysis of data t-test	**.710**	-.499	.109
INF	Information technology to monitor patient outcomes	**.889**	.427	-.026

EBP	More complex statistical analysis of data Chi square	**.679**	-.494	.103
EBP	More complex statistical analysis Regression Analysis	**.658**	-.493	.091
TC	Assuming the role of team leader	**.864**	.667	-.163
TC	Team Training	**.797**	.546	-.306
EBP	More complex statistical analysis of data ANOVA	**.585**	-.484	.076
INF	Locating and using high quality healthcare	**.747**	.706	-.076
TC	Assuming the role of team member	**.654**	.641	-.011
QI	Table on VAP	.080	-.006	.046
EBP	Practice Guidelines	.034	.013	-.017
EBP	EBP is defined as	.041	.024	.005
Safety	Culture of safety actions in near-miss	**.052**	-.031	-.014
INF	Technology/ information related to quality and safety	.031	.014	.012
Patient Care				
PCC	Patient Centered Care	.459	**.555**	.161
PCC	Integrating religious and cultural values	.494	**.507**	.102
TC	Communicating with other healthcare providers	-.011	.032	.011
Safety	Hand-off communication between caregivers	.046	**.063**	-.033
Safety	A culture of healthcare safety exception	.010	.043	.014
TC	Teamwork and patient safety enhanced scenario	.021	.027	-.006
EBP	Finding, critically appraising, incorporating EBP	-.003	.007	-.001
Informatics				
INF	Electronic Medical Records	.563	.442	**.622**
INF	Computerized Provider Order Entry	.526	.158	**.561**
PCC	The patient is scheduled to have a central line	.020	.012	.044

Abbreviations; QI, Quality improvement; EBP, Evidence based practice; INF, Informatics; TC, Teamwork and Collaboration; PCC, Patient centered care

* Coefficients greater than .50 are in bold type by factor
Extraction Method: Principal Component Analysis

Table R.2

Knowledge Factor Analysis

Knowledge Factor Analysis (n = 366)					
QSEN Domain	QUISKA2 Attitude Questions	Factors 1	2	3	4
QI	Strategy for nurses to learn about outcomes	**0.072**	0.017	0.041	0.068
QI	Understanding the source of variation	0.016	-0.007	-0.018	-0.035
EBP	The strongest level of support for EBP	0.026	0.012	-0.016	0.005
EBP	EBP is defined as	**0.052**	-0.007	0.018	0.084
	Application of EBP				
EBP	Practice Guidelines	0.017	0.035	-0.035	-0.005
EBP	Research survey review	0.02	0.031	0.012	0.463
	Safety				
Safety	Contributors to patient safety exception	0.148	0.014	0.076	0.049
QI	Drawback of using only automatic bed alarms	0.109	0.209	-0.028	**0.053**
Safety	Creating/sustaining a culture of safety exception	0.086	0.114	0.03	0.102
Safety	Culture of safety actions in near-miss	0.03	0.033	0.018	0.003
Safety	Example of culture of safety	0.046	0.042	0.059	0.024
	Teamwork				
QI	Cause of error, responsibility and accountability	0.024	0.014	0.393	0.003
TC	Teamwork and patient safety enhanced scenario	0.011	0.056	-0.021	0.012
TC	System examples of effective team except	0.028	0.013	0.002	0.063
TC	Teamwork and medication errors except	0.028	0.062	0.002	0.012

Abbreviations; QI, Quality improvement; EBP, Evidence based practice; TC, Teamwork and Collaboration, * Coefficients greater than .50 are in bold type by factor. Extraction Method: Principal Component Analysis

Table R.3

Skills Factor Analysis

Skills Factor Analysis (n = 366)					
		Factor			
QSEN Domain	QUISKA2 Attitude Questions	1	2	3	4
	EBP & Research Concepts				
EBP	Analysis of data Chi square	**.954**	.078	.235	.098
EBP	Analysis of data ANOVA	**.881**	.028	.222	.075
EBP	Analysis of data t-test	**.958**	.090	.272	.091
EBP	Analysis of data Regression Analysis	**.915**	.040	.238	.116
EBP	Critical appraisal of research studies	**.736**	.244	.092	.355
EBP	Literature searches for relevant EBP	**.697**	.406	.118	.324
EBP	Analysis of data normal (Gaussian curve)	**.615**	.094	.563	.153
	Informatics, Patient Center Care, Teamwork				
TC	When it is important to communicate	-.025	.017	-.022	.001
INF	Locating and using high quality healthcare	.119	**.974**	.137	.433
TC	Assuming the role of team member	.048	**.932**	.135	.309
PCC	Patient Centered Care	.021	**.785**	.100	.092
TC	Assuming the role of team leader	.144	**.913**	.179	.645
PCC	Integrating religious and cultural values	.038	**.715**	.122	.128
INF	Using information technology	.310	**.656**	.259	.507
TC	Teamwork and patient safety enhanced scenario	-.006	.038	.010	.012
Safety	Examples of effective team functioning except	.033	.075	-.020	.005
Safety	Sustaining a culture of healthcare safety	-.021	.045	-.017	.000
	Simple QI				
QI	Graphical representation of data on run charts	.422	.116	**1.014**	.305
QI	Graphical representation of data on control charts	.454	.149	**1.002**	.277
QI	Graphical representation of data on Pareto charts	.552	.149	**.910**	.256
QI	Graphical representation of data on histogram	.513	.215	**.941**	.170
	Common QI Processes				
QI	Quality improvement PDCA or Six Sigma	.430	.211	.504	**1.229**
QI	Collecting data from chart review	.312	.436	.322	**1.153**
QI	Process mapping or flowcharting	.284	.419	.478	**.903**
TC	Team Training	.076	.704	.270	**.716**
QI	Root cause analysis	.577	.138	.436	**.718**
QI	Failure Mode and Effects Analysis	.561	.047	.560	.638
TC	Hand-off communication between caregivers	-.014	.030	-.002	.092
EBP	Practice Guidelines	.013	.021	.003	.038
EBP	Strategy to empower patients and families	-.025	.020	-.015	.034

Extraction Method: Principal Component Analysis. * Coefficients greater than .50 are in bold type by factor
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 9 iterations.

Table R.4

Attitude Factor Analysis

Attitude Factor Analysis (n = 366)

QSEN Domain	QUISKA2 Attitude Questions	Factors 1	2
	Routine Patient Care		
PCC	Importance of patient's expectations for pain relief	.328	.103
PCC	Importance of developing plan of care	.375	.115
PCC	Importance of patient and family involvement in pain management plan	.316	.130
TC	Importance of Teamwork	.259	.114
TC	Importance of teamwork and collaboration - outcomes	.257	.132
INF	Importance of nurse in information technology	.330	.103
QI	Importance of QI Projects	.292	.217
EBP	Importance of EBP to determine best practice	.268	.231
	Safety Culture		
EBP	Importance of reading current literature on practice	.093	**.545**
Safety	Importance of standard Policy & Procedures	.185	.327
QI	Importance of Performance Measures	.222	.251

Extraction Method: Principal Component Analysis. * Coefficients greater than .50 are in bold type by factor.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Appendix S, Nursing Role between Role Comparison Tables

Table S.1

Nursing Role between Role Comparisons - Knowledge Subset

Nursing Role Between Role Comparisons - Knowledge Subset						
					95% Confidence Interval	
Nursing Role (A)	As Compared to (B)	Mean Difference (A-B)	Std. Error	Sig.	Lower Bound	Upper Bound
Direct Care Nurses	Front Line Leaders	-.0490*	.01228	.000	-.0786	-.0195
	Nurse Executives	-.0490	.02078	.057	-.0990	.0010
Front Line Leaders	Direct Care Nurses	.0490*	.01228	.000	.0195	.0786
	Nurse Executives	.0000	.02216	1.000	-.0533	.0533
Nurse Executives	Direct Care Nurses	.0490	.02078	.057	-.0010	.0990
	Front Line Leaders	.0000	.02216	1.000	-.0533	.0533
Based on observed means. The error term is Mean Square(Error) = .011. *. The mean difference is significant at the .05 level.						

Table S.2

Nursing Role between Role Comparisons - Skills Critical Thinking Subset

Nursing Role Between Role Comparisons - Skills Critical Thinking Subset						
					95% Confidence Interval	
Nursing Role (A)	As Compared to (B)	Mean Difference (A-B)	Std. Error	Sig.	Lower Bound	Upper Bound
Direct Care Nurses	Front Line Leaders	-.0449*	.01618	.017	-.0838	-.0060
	Nurse Executives	-.0997*	.02738	.001	-.1656	-.0339
Front Line Leaders	Direct Care Nurses	.0449*	.01618	.017	.0060	.0838
	Nurse Executives	-.0548	.02918	0.183	-.1250	.0154
Nurse Executives	Direct Care Nurses	.0997*	.02738	.001	.0339	.1656
	Front Line Leaders	.0548	.02918	0.183	-.0154	.1250
Based on observed means. The error term is Mean Square(Error) = .019. *. The mean difference is significant at the .05 level.						

Table S.3

Nursing Role between Role Comparisons - Skills Proficiency/ Frequency Subset

Nursing Role Between Role Comparisons - Skills Proficiency/Frequency Subset						
					95% Confidence Interval	
Nursing Role (A)	As Compared to (B)	Mean Difference (A-B)	Std. Error	Sig.	Lower Bound	Upper Bound
Direct Care Nurses	Front Line Leaders	-.3294*	.09431	.002	-.5563	-.1026
	Nurse Executives	-1.1708*	.15956	.000	-1.5546	-.7871
Front Line Leaders	Direct Care Nurses	.3294*	.09431	.002	.1026	.5563
	Nurse Executives	-.8414*	.17009	0.000	-1.2505	-.4323
Nurse Executives	Direct Care Nurses	1.1708*	.15956	.000	.7871	1.5546
	Front Line Leaders	.8414*	.17009	0.000	.4323	1.2505
Based on observed means. The error term is Mean Square(Error) = .637.						
*. The mean difference is significant at the .05 level.						

Table S.4

Nursing Role between Role Comparisons - Attitude Subset

Nursing Role Between Role Comparisons - Attitude Subset						
					95% Confidence Interval	
Nursing Role (A)	As Compared to (B)	Mean Difference (A-B)	Std. Error	Sig.	Lower Bound	Upper Bound
Direct Care Nurses	Front Line Leaders	-.1143*	.03913	.011	-.2084	-.0202
	Nurse Executives	-.1920*	.06620	.012	-.3512	-.0328
Front Line Leaders	Direct Care Nurses	.1143*	.03913	.011	.0202	.2084
	Nurse Executives	-.0777	.07057	0.814	-.2475	.0920
Nurse Executives	Direct Care Nurses	.1920*	.06620	.012	.0328	.3512
	Front Line Leaders	.0777	.07057	0.814	-.0920	.2475
Based on observed means. The error term is Mean Square(Error) = .110.						
*. The mean difference is significant at the .05 level.						

Appendix T, Nursing Role to Level of Education Comparison - Knowledge

Table T.1

Nursing Role to Level of Education Comparison - Knowledge- Direct Care Nurses

Participant Scores - Nursing Roles to Level of Education Comparisons Knowledge							
Nursing Role - Direct Care Nurses (n = 235)							
						95% Confidence Interval	
Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Direct Care	Diploma	Associate	.0245	.03394	1.000	-.0717	.1207
		BSN	-.0191	.03255	1.000	-.1113	.0732
		MS/ MSN	-.0605	.04124	1.000	-.1774	.0564
		Master's other	-.0353	.07715	1.000	-.2540	.1834
	Associate	Diploma	-.0245	.03394	1.000	-.1207	.0717
		BSN	-.0436*	.01508	.042	-.0863	-.0008
		MS/ MSN	-.0850*	.02947	.043	-.1685	-.0014
		Master's other	-.0598	.07156	1.000	-.2626	.1430
	BSN	Diploma	.0191	.03255	1.000	-.0732	.1113
		Associate	.0436*	.01508	.042	.0008	.0863
		MS/ MSN	-.0414	.02786	1.000	-.1204	.0375
		Master's other	-.0162	.07091	1.000	-.2172	.1848
	MS/ MSN	Diploma	.0605	.04124	1.000	-.0564	.1774
		Associate	.0850*	.02947	.043	.0014	.1685
		BSN	.0414	.02786	1.000	-.0375	.1204
		Master's other	.0252	.07529	1.000	-.1882	.2386
	Master's other	Diploma	.0353	.07715	1.000	-.1834	.2540
		Associate	.0598	.07156	1.000	-.1430	.2626
		BSN	.0162	.07091	1.000	-.1848	.2172
		MS/ MSN	-.0252	.07529	1.000	-.2386	.1882

Abbreviations: BSN, Bachelor of Science; MC, Multiple Choices; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .479. *. The mean difference is significant at the .05 level.

*. The mean difference is significant at the .05 level.

Table T.2

Nursing Role to Level of Education Comparison - Knowledge- Front Line Leaders

Participant Scores - Nursing Roles to Level of Education Comparisons Knowledge							
Nursing Role - Front Line Leader (n = 103)							
Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Front Line Leader	Diploma	Associate	-.0184	.05137	1.000	-.1659	.1291
		BSN	-.0672	.04580	1.000	-.1988	.0643
		MS/ MSN	-.0512	.04893	1.000	-.1917	.0894
		Master's other	-.0809	.05867	1.000	-.2494	.0876
	Associate	Diploma	.0184	.05137	1.000	-.1291	.1659
		BSN	-.0488	.03264	1.000	-.1426	.0449
		MS/ MSN	-.0328	.03690	1.000	-.1388	.0732
		Master's other	-.0625	.04908	1.000	-.2035	.0785
	BSN	Diploma	.0672	.04580	1.000	-.0643	.1988
		Associate	.0488	.03264	1.000	-.0449	.1426
		MS/ MSN	.0161	.02865	1.000	-.0662	.0984
		Master's other	-.0137	.04323	1.000	-.1378	.1105
	MS/ MSN	Diploma	.0512	.04893	1.000	-.0894	.1917
		Associate	.0328	.03690	1.000	-.0732	.1388
		BSN	-.0161	.02865	1.000	-.0984	.0662
		Master's other	-.0297	.04653	1.000	-.1634	.1039
	Master's Other	Diploma	.0809	.05867	1.000	-.0876	.2494
		Associate	.0625	.04908	1.000	-.0785	.2035
		BSN	.0137	.04323	1.000	-.1105	.1378
		MS/ MSN	.0297	.04653	1.000	-.1039	.1634

Abbreviations: BSN, Bachelor of Science; MC, Multiple Choices; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .479.
*. The mean difference is significant at the .05 level.

Table T.3

Nursing Role to Level of Education Comparison - Knowledge- Nurse Executives

Participant Scores - Nursing Roles to Level of Education Comparisons Knowledge							
Nursing Role - Nurse Executives (n = 28)							
						95% Confidence Interval	
Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Nurse Executive	BSN	MS/ MSN	-.0196	.04516	1.000	-.1495	.1102
		Master's other	-.0049	.05907	1.000	-.1747	.1649
		Doctorate	-.0196	.05541	1.000	-.1789	.1397
	MS/MSN	BSN	.0196	.04516	1.000	-.1102	.1495
		Master's other	.0147	.05232	1.000	-.1357	.1651
		Doctorate	.0000	.04816	1.000	-.1385	.1385
	Master's Other	BSN	.0049	.05907	1.000	-.1649	.1747
		MS/ MSN	-.0147	.05232	1.000	-.1651	.1357
		Doctorate	-.0147	.06139	1.000	-.1912	.1618
	Doctorate	BSN	.0196	.05541	1.000	-.1397	.1789
		MS/ MSN	.0000	.04816	1.000	-.1385	.1385
		Master's other	.0147	.06139	1.000	-.1618	.1912

Abbreviations: BSN, Bachelor of Science; MC, Multiple Choices; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .008.

*. The mean difference is significant at the .05 level.

Appendix U, Nursing Role - Knowledge Subset

Table U.1

Nursing Role - Knowledge Subset

Nursing Role - Knowledge			
Comparison to Facility, Unit of Work, Level of Education, Certification, Years from Nursing School, Previous QI Training			
Nursing Role	As compared to	F	Sig.
Direct Care (n = 235)			
	Facility	0.306	.821
	Unit of work	0.650	.714
	Level of Education *	2.779	.019
	Certification	0.055	.815
	Years from Nursing School	1.214	.306
	Previous QI Training	0.004	.948
Front Line Leader	(n = 103)		
	Facility	2.243	.088
	Unit of work	0.804	.601
	Level of Education	1.071	.375
	Certification	0.141	.708
	Years from Nursing School	0.562	.642
	Previous QI Training *	4.163	.044
Nurse Executive	(n = 28)		
	Facility	0.723	.548
	Unit of work	1.730	.163
	Level of Education	0.072	.990
	Certification	0.304	.586
	Years from Nursing School	0.407	.670
	Previous QI Training	0.042	.839
*. The mean difference is significant at the .05 level			

Appendix V, Nursing Role to Level of Education Comparison - Skills Critical Thinking

Table V.1

Nursing Role to Level of Education Comparison - Skills Critical Thinking- Direct Care Nurses

Participant Scores - Nursing Roles to Level of Education Comparisons Skills Critical Thinking							
Nursing Role - Direct Care Nurses (n = 235)							
						95% Confidence Interval	
Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Direct Care	Diploma	Associate	.0983	.04782	.410	-.0373	.2338
		BSN	.0188	.04586	1.000	-.1112	.1488
		MS/ MSN	-.0200	.05810	1.000	-.1847	.1447
		Master's other	.0467	.10869	1.000	-.2614	.3547
	Associate	Diploma	-.0983	.04782	.410	-.2338	.0373
		BSN	-.0795*	.02125	.002	-.1397	-.0193
		MS/ MSN	-.1183*	.04152	.048	-.2360	-.0006
		Master's other	-.0516	.10081	1.000	-.3373	.2341
	BSN	Diploma	-.0188	.04586	1.000	-.1488	.1112
		Associate	.0795*	.02125	.002	.0193	.1397
		MS/ MSN	-.0388	.03925	1.000	-.1500	.0725
		Master's other	.0279	.09989	1.000	-.2552	.3110
	MS/ MSN	Diploma	.0200	.05810	1.000	-.1447	.1847
		Associate	.1183*	.04152	.048	.0006	.2360
		BSN	.0388	.03925	1.000	-.0725	.1500
		Master's other	.0667	.10607	1.000	-.2340	.3673
	Master's other	Diploma	-.0467	.10869	1.000	-.3547	.2614
		Associate	.0516	.10081	1.000	-.2341	.3373
		BSN	-.0279	.09989	1.000	-.3110	.2552
		MS/ MSN	-.0667	.10607	1.000	-.3673	.2340

Abbreviations: BSN, Bachelor of Science; CT, Critical Thinking; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square(Error) = .014.
*. The mean difference is significant at the .05 level.

Table V.2

Nursing Role to Level of Education Comparison - Skills Critical Thinking-Front Line Leaders

Participant Scores - Nursing Roles to Level of Education Comparisons Skills Critical Thinking							
Nursing Role - Front Line Leader (n = 103)							
						95% Confidence Interval	
Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Front Line Leader	Diploma	Associate	-.0333	.05447	1.000	-.1898	.1231
		BSN	-.1034	.04857	.358	-.2429	.0361
		MS/ MSN	-.1159	.05188	.277	-.2650	.0331
		Master's other	-.1000	.06221	1.000	-.2787	.0787
	Associate	Diploma	.0333	.05447	1.000	-.1231	.1898
		BSN	-.0701	.03461	.456	-.1695	.0293
		MS/ MSN	-.0826	.03913	.373	-.1950	.0298
		Master's other	-.0667	.05205	1.000	-.2161	.0828
	BSN	Diploma	.1034	.04857	.358	-.0361	.2429
		Associate	.0701	.03461	.456	-.0293	.1695
		MS/ MSN	-.0125	.03038	1.000	-.0998	.0747
		Master's other	.0034	.04583	1.000	-.1282	.1350
	MS/ MSN	Diploma	.1159	.05188	.277	-.0331	.2650
		Associate	.0826	.03913	.373	-.0298	.1950
		BSN	.0125	.03038	1.000	-.0747	.0998
		Master's other	.0159	.04934	1.000	-.1257	.1576
	Master's Other	Diploma	.1000	.06221	1.000	-.0787	.2787
		Associate	.0667	.05205	1.000	-.0828	.2161

	BSN	-.0034	.04583	1.000	-.1350	.1282
	MS/ MSN	-.0159	.04934	1.000	-.1576	.1257

Abbreviations: BSN, Bachelor of Science; CT, Critical Thinking; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .014.
*. The mean difference is significant at the .05 level.

Table V.3

Nursing Role to Level of Education Comparison - Skills Critical Thinking- Nurse Executives

Participant Scores - Nursing Roles to Level of Education Comparisons
Skills Critical Thinking

Nursing Role - Nurse Executives (n = 28)

Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Nurse Executive	BSN	MS/ MSN	-.0812	.05928	1.000	-.2516	.0892
		Master's other	-.1222	.07753	.768	-.3451	.1007
		Doctorate	-.0556	.07273	1.000	-.2647	.1536
	MS/MSN	BSN	.0812	.05928	1.000	-.0892	.2516
		Master's other	-.0410	.06868	1.000	-.2385	.1564
		Doctorate	.0256	.06321	1.000	-.1561	.2074
	Master's Other	BSN	.1222	.07753	.768	-.1007	.3451
		MS/ MSN	.0410	.06868	1.000	-.1564	.2385
		Doctorate	.0667	.08058	1.000	-.1650	.2983
	Doctorate	BSN	.0556	.07273	1.000	-.1536	.2647
		MS/ MSN	-.0256	.06321	1.000	-.2074	.1561
		Master's other	-.0667	.08058	1.000	-.2983	.1650

Abbreviations: BSN, Bachelor of Science; CT, Critical Thinking; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .014.
*. The mean difference is significant at the .05 level.

Appendix W, Nursing Role - Skills Critical Thinking Subset

Table W.1

Nursing Role - Skills Critical Thinking Subset

Nursing Role - Skills Critical Thinking			
Comparison to Facility, Unit of Work, Level of Education, Certification, Years from Nursing School, Previous QI Training			
Nursing Role	As compared to	F	Sig.
Direct Care (n = 235)			
	Facility	0.377	.770
	Unit of Work	0.186	.988
	Level of Education *	3.566	.004
	Certification	1.073	.301
	Years from Nursing School	0.341	.850
	Previous QI Training	0.001	.982
Front Line Leader	(n = 103)		
	Facility	2.125	.102
	Unit of Work *	2.765	.009
	Level of Education	2.297	.064
	Certification	3.154	.079
	Years from Nursing School	0.743	.529
	Previous QI Training	1.118	.293
Nurse Executive	(n = 28)		
	Facility	0.001	1.000
	Unit of Work	0.734	.628
	Level of Education	1.055	.401
	Certification	0.081	.779
	Years from Nursing School	0.081	.779
	Previous QI Training	0.178	.676
*. The mean difference is significant at the .05 level			

Appendix X, Nursing Role to Level of Education Comparison - Skills Proficiency/Frequency

Table X.1

Nursing Role to Level of Education Comparison - Skills Proficiency/Frequency- Direct Care Nurses

Participant Scores - Nursing Roles to Level of Education Comparisons Skills Proficiency/Frequency

Nursing Role - Direct Care Nurses (n = 235)

Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Direct Care	Diploma	Associate	-.3475	.24787	1.000	-1.0501	.3550
		BSN	-.2032	.23771	1.000	-.8769	.4706
		MS/ MSN	-1.2757*	.30115	.000	-2.1293	-.4221
		Master's other	-1.1900	.56341	.358	-2.7869	.4069
	Associate	Diploma	.3475	.24787	1.000	-.3550	1.0501
		BSN	.1444	.11015	1.000	-.1678	.4566
		MS/ MSN	-.9282*	.21523	.000	-1.5382	-.3182
		Master's other	-.8425	.52255	1.000	-2.3236	.6386
	BSN	Diploma	.2032	.23771	1.000	-.4706	.8769
		Associate	-.1444	.11015	1.000	-.4566	.1678
		MS/ MSN	-1.0726*	.20344	.000	-1.6492	-.4959
		Master's other	-.9868	.51781	.579	-2.4545	.4808
	MS/ MSN	Diploma	1.2757*	.30115	.000	.4221	2.1293
		Associate	.9282*	.21523	.000	.3182	1.5382
		BSN	1.0726*	.20344	.000	.4959	1.6492
		Master's other	.0857	.54983	1.000	-1.4727	1.6441
	Master's other	Diploma	1.1900	.56341	.358	-.4069	2.7869
		Associate	.8425	.52255	1.000	-.6386	2.3236
		BSN	.9868	.51781	.579	-.4808	2.4545
		MS/ MSN	-.0857	.54983	1.000	-1.6441	1.4727

Abbreviations: BSN, Bachelor of Science; MC, Multiple Choices; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .479.

*. The mean difference is significant at the .05 level.

Table X.2

Nursing Role to Level of Education Comparison - Skills Proficiency/Frequency- Front Line Leaders

Participant Scores - Nursing Roles to Level of Education Comparisons Skills Proficiency/Frequency							
Nursing Role - Front Line Leaders (n = 103)							
Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Front Line Leader	Diploma	Associate	-.3613	.36127	1.000	-1.3989	.6762
		BSN	-.6503	.32212	.462	-1.5755	.2748
		MS/ MSN	-1.1557*	.34413	.011	-2.1440	-.1674
		Master's other	-1.0030	.41260	.169	-2.1880	.1820
	Associate	Diploma	.3613	.36127	1.000	-.6762	1.3989
		BSN	-.2890	.22955	1.000	-.9483	.3702
		MS/ MSN	-.7944*	.25953	.028	-1.5397	-.0490
		Master's other	-.6417	.34521	.661	-1.6331	.3498
	BSN	Diploma	.6503	.32212	.462	-.2748	1.5755
		Associate	.2890	.22955	1.000	-.3702	.9483
		MS/ MSN	-.5054	.20150	.138	-1.0841	.0734
		Master's other	-.3526	.30400	1.000	-1.2257	.5204
	MS/ MSN	Diploma	1.1557*	.34413	.011	.1674	2.1440
		Associate	.7944*	.25953	.028	.0490	1.5397
		BSN	.5054	.20150	.138	-.0734	1.0841
		Master's other	.1527	.32723	1.000	-.7871	1.0925
	Master's Other	Diploma	1.0030	.41260	.169	-.1820	2.1880
		Associate	.6417	.34521	.661	-.3498	1.6331
		BSN	.3526	.30400	1.000	-.5204	1.2257
		MS/ MSN	-.1527	.32723	1.000	-1.0925	.7871

Abbreviations: BSN, Bachelor of Science; MC, Multiple Choices; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .479.

*. The mean difference is significant at the .05 level.

Table X.3

Nursing Role to Level of Education Comparison - Skills Proficiency/Frequency- Nurse Executive

Participant Scores - Nursing Roles to Level of Education Comparisons Skills Proficiency/Frequency							
Nursing Role - Nurse Executives (n = 28)							
						95% Confidence Interval	
Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Nurse Executive	BSN	MS/ MSN	-.9188	.34174	.077	-1.9013	.0637
		Master's other	-1.0278	.44695	.183	-2.3128	.2572
		Doctorate	-1.6244*	.41928	.004	-2.8299	-.4190
	MS/MSN	BSN	.9188	.34174	.077	-.0637	1.9013
		Master's other	-.1090	.39590	1.000	-1.2472	1.0293
		Doctorate	-.7056	.36437	.388	-1.7532	.3420
	Master's Other	BSN	1.0278	.44695	.183	-.2572	2.3128
		MS/ MSN	.1090	.39590	1.000	-1.0293	1.2472
		Doctorate	-.5967	.46449	1.000	-1.9321	.7388
	Doctorate	BSN	1.6244*	.41928	.004	.4190	2.8299
		MS/ MSN	.7056	.36437	.388	-.3420	1.7532
		Master's other	.5967	.46449	1.000	-.7388	1.9321

Abbreviations: BSN, Bachelor of Science; MC, Multiple Choices; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .479.

*. The mean difference is significant at the .05 level.

Appendix Y, Nursing Role - Skills Proficiency/Frequency Subset

Table Y.1

Nursing Role - Skills Proficiency/Frequency Subset

Nursing Role - Skills Proficiency/Frequency			
Comparison to Facility, Unit of Work, Level of Education, Certification, Years from Nursing School, Previous QI Training			
Nursing Role	As compared to	F	Sig.
Direct Care (n = 235)			
	Facility	1.131	.337
	Unit of Work	1.000	.432
	Level of Education *	7.510	<0.001
	Certification	0.319	.573
	Years from Nursing School	0.309	.872
	Previous QI Training *	25.432	<0.001
Front Line Leader (n = 103)			
	Facility	1.708	.170
	Unit of Work	1.091	.377
	Level of Education *	4.286	.003
	Certification	1.390	.241
	Years from Nursing School	0.256	.857
	Previous QI Training *	16.490	<0.001
Nurse Executive (n = 28)			
	Facility	2.729	.066
	Unit of Work	2.101	.096
	Level of Education *	3.833	.016
	Certification	0.540	.469
	Years from Nursing School	1.624	.217
	Previous QI Training	1.540	.226
*. The mean difference is significant at the .05 level			

Appendix Z, Nursing Role to Level of Education Comparison - Attitude

Table Z.1

Nursing Role to Level of Education Comparison - Attitude - Direct Care Nurses

Participant Scores - Nursing Roles to Level of Education Comparisons Attitude							
Nursing Role - Direct Care Nurses (n = 235)							
Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Direct Care	Diploma	Associate	.1188	.12978	1.000	-.2491	.4866
		BSN	.1574	.12446	1.000	-.1954	.5102
		MS/ MSN	-.0325	.15768	1.000	-.4794	.4145
		Master's other	-.0909	.29500	1.000	-.9271	.7452
	Associate	Diploma	-.1188	.12978	1.000	-.4866	.2491
		BSN	.0386	.05767	1.000	-.1248	.2021
		MS/ MSN	-.1512	.11269	1.000	-.4706	.1682
		Master's other	-.2097	.27361	1.000	-.9852	.5658
	BSN	Diploma	-.1574	.12446	1.000	-.5102	.1954
		Associate	-.0386	.05767	1.000	-.2021	.1248
		MS/ MSN	-.1899	.10652	.760	-.4918	.1121
		Master's other	-.2483	.27112	1.000	-1.0168	.5202
	MS/ MSN	Diploma	.0325	.15768	1.000	-.4145	.4794
		Associate	.1512	.11269	1.000	-.1682	.4706
		BSN	.1899	.10652	.760	-.1121	.4918
		Master's other	-.0584	.28789	1.000	-.8744	.7575
	Master's other	Diploma	.0909	.29500	1.000	-.7452	.9271
		Associate	.2097	.27361	1.000	-.5658	.9852
		BSN	.2483	.27112	1.000	-.5202	1.0168
		MS/ MSN	.0584	.28789	1.000	-.7575	.8744
Abbreviations: BSN, Bachelor of Science; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .016.							

Table Z.2

Nursing Role to Level of Education Comparison - Attitude - Front Line Leaders

Participant Scores - Nursing Roles to Level of Education Comparisons Attitude							
Nursing Role - Front Line Leaders (n = 103)							
Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Front Line Leader	Diploma	Associate	.0771	.10275	1.000	-.2180	.3722
		BSN	.0000	.09162	1.000	-.2631	.2631
		MS/ MSN	-.0412	.09788	1.000	-.3223	.2399
		Master's other	-.1218	.11735	1.000	-.4588	.2153
	Associate	Diploma	-.0771	.10275	1.000	-.3722	.2180
		BSN	-.0771	.06529	1.000	-.2646	.1104
		MS/ MSN	-.1183	.07382	1.000	-.3303	.0937
		Master's other	-.1989	.09818	.455	-.4808	.0831
	BSN	Diploma	.0000	.09162	1.000	-.2631	.2631
		Associate	.0771	.06529	1.000	-.1104	.2646
		MS/ MSN	-.0412	.05731	1.000	-.2058	.1234
		Master's other	-.1218	.08646	1.000	-.3701	.1266
	MS/ MSN	Diploma	.0412	.09788	1.000	-.2399	.3223
		Associate	.1183	.07382	1.000	-.0937	.3303
		BSN	.0412	.05731	1.000	-.1234	.2058
		Master's other	-.0805	.09307	1.000	-.3478	.1868
	Master's Other	Diploma	.1218	.11735	1.000	-.2153	.4588
		Associate	.1989	.09818	.455	-.0831	.4808
		BSN	.1218	.08646	1.000	-.1266	.3701
		MS/ MSN	.0805	.09307	1.000	-.1868	.3478
Abbreviations: BSN, Bachelor of Science; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .016.							

Table Z.3

Nursing Role to Level of Education Comparison - Attitude - Nurse Executives

Participant Scores - Nursing Roles to Level of Education Comparisons Attitude							
Nursing Role - Nurse Executives (n = 28)							
						95% Confidence Interval	
Nursing Role	Level of Education (I)	Comparison Level of Education (J)	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Nurse Executive	BSN	MS/ MSN	.0303	.06314	1.000	-.1512	.2118
		Master's other	-.0152	.08258	1.000	-.2526	.2223
		Doctorate	-.0061	.07747	1.000	-.2288	.2167
	MS/MSN	BSN	-.0303	.06314	1.000	-.2118	.1512
		Master's other	-.0455	.07315	1.000	-.2558	.1649
		Doctorate	-.0364	.06733	1.000	-.2299	.1572
	Master's Other	BSN	.0152	.08258	1.000	-.2223	.2526
		MS/ MSN	.0455	.07315	1.000	-.1649	.2558
		Doctorate	.0091	.08582	1.000	-.2377	.2558
	Doctorate	BSN	.0061	.07747	1.000	-.2167	.2288
		MS/ MSN	.0364	.06733	1.000	-.1572	.2299
		Master's other	-.0091	.08582	1.000	-.2558	.2377
Abbreviations: BSN, Bachelor of Science; MS/MSN, Master of Science/Master of Science in Nursing. Based on observed means. The error term is Mean Square (Error) = .016.							

Appendix AA, Nursing Role - Attitude Subset

Table AA.1

Nursing Role - Attitude Subset

Nursing Role - Attitude			
Comparison to Facility, Unit of Work, Level of Education, Certification, Years from Nursing School, Previous QI Training			
Nursing Role	As compared to	F	Sig.
Direct Care (n = 235)			
	Facility	0.459	.711
	Unit of Work	1.067	.386
	Level of Education	1.042	.394
	Certification	0.040	.841
	Years from Nursing School	1.999	.095
	Previous QI Training	1.379	.242
Front Line Leader (n = 103)			
	Facility	1.401	.247
	Unit of Work	1.490	.171
	Level of Education	1.207	.313
	Certification	0.117	.733
	Years from Nursing School	2.261	.086
	Previous QI Training	0.015	.902
Nurse Executive (n = 28)			
	Facility	2.185	.116
	Unit of Work *	2.776	.038
	Level of Education	0.210	.930
	Certification	0.380	.543
	Years from Nursing School	1.350	.278
	Previous QI Training	2.542	.123
*. The mean difference is significant at the .05 level			

Appendix BB, Level of Education - KSA

Table BB.1

Level of Education - KSA

Level of Education - KSA						
Level of education	As compared to: Level of Education	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Diploma	Associate	-.0938	.08669	1.000	-.3499	.1624
	BSN	-.1073	.08156	1.000	-.3483	.1337
	MS/MSN	-.5258*	.09137	<0.001	-.7958	-.2558
	Master's	-.5150*	.11813	<0.001	-.8641	-.1659
	Other Doctorate	-.9795*	.15628	<0.001	-1.4412	-.5177
Associate in Nursing	Diploma	.0938	.08669	1.000	-.1624	.3499
	BSN	-.0135	.04422	1.000	-.1442	.1172
	MS/MSN	-.4320*	.06043	<0.001	-.6106	-.2534
	Master's	-.4212*	.09622	<0.001	-.7056	-.1369
	Other Doctorate	-.8857*	.14045	<0.001	-1.3007	-.4707
Bachelor's in Nursing (BSN)	Diploma	.1073	.08156	1.000	-.1337	.3483
	Associate	.0135	.04422	1.000	-.1172	.1442
	MS/MSN	-.4185*	.05282	<0.001	-.5746	-.2624
	Master's	-.4077*	.09163	<0.001	-.6785	-.1370
	Other Doctorate	-.8722*	.13735	<0.001	-1.2780	-.4663
Master of Science /Master of Science in Nursing (MS/MSN)	Diploma	.5258*	.09137	<0.001	.2558	.7958
	AD	.4320*	.06043	<0.001	.2534	.6106
	BSN	.4185*	.05282	<0.001	.2624	.5746
	Master's	.0108	.10046	1.000	-.2861	.3076
	Other Doctorate	-.4537*	.14339	.025	-.8774	-.0300
Master's Other	Diploma	.5150*	.11813	<0.001	.1659	.8641
	Associate	.4212*	.09622	<0.001	.1369	.7056
	BSN	.4077*	.09163	<0.001	.1370	.6785
	MS/MSN	-.0108	.10046	1.000	-.3076	.2861
	Doctorate	-.4644	.16176	.065	-.9424	.0135
Doctorate	Diploma	.9795*	.15628	<0.001	.5177	1.4412

	Associate	.8857*	.14045	<0.001	.4707	1.3007
	BSN	.8722*	.13735	<0.001	.4663	1.2780
	MS/MSN	.4537*	.14339	.025	.0300	.8774
	Master's	.4644	.16176	.065	-.0135	.9424
	Other					

Based on observed means.
The error term is Mean Square (Error) = .110.
*. The mean difference is significant at the .05 level.

Appendix CC, Level of Education - Knowledge

Table CC.1

Level of Education - Knowledge

Level of Education - Knowledge			
Comparison to Facility, Unit of Work, Nursing Role, Certification, Years from Nursing School, Previous QI Training			
Level of Education	As compared to	F	Sig.
Diploma (n = 18)			
	Facility	0.290	.832
	Unit of work	1.009	.467
	Nursing Role	0.192	.827
	Certification	0.085	.774
	Years from Nursing School	.	.
	Previous QI training	1.600	.224
Associate (n = 78)			
	Facility	0.280	.840
	Unit of work	0.621	.758
	Nursing Role	3.004	.087
	Certification	.620	.433
	Years from Nursing School	1.080	.373
	Previous QI training	.578	.449
BSN (n = 201)			
	Facility	1.592	.192
	Unit of work	.786	.616
	Nursing Role*	4.881	.009
	Certification	.164	.686
	Years from Nursing School	.696	.596
	Previous QI training	.764	.383
MS/ MSN (n = 49)			
	Facility	0.441	.725
	Unit of work	0.590	.780
	Nursing Role	0.066	.937
	Certification	1.992	.165

	Years from Nursing School	0.707	.553
	Previous QI training	0.071	.792
Master's Other (n = 14)			
	Facility	2.999	.082
	Unit of work	1.882	.198
	Nursing Role	0.319	.734
	Certification	.688	.423
	Years from Nursing School	.358	.707
	Previous QI training	2.911	.114
Doctorate (n = 6)			
	Facility	.640	.469
	Unit of work	5.778	.151
	Nursing Role	.833	.413
	Certification	2.042	.226
	Years from Nursing School	1.136	.429
	Previous QI training	.	.

*. The mean difference is significant at the .05 level

Appendix DD, Level of Education - Skills Critical Thinking

Table DD.1

Skills Critical Thinking

Level of Education - Skills Critical Thinking			
Comparison to Facility, Unit of Work, Nursing Role, Certification, Years from Nursing School, Previous QI Training			
Level of Education	As compared to	F	Sig.
Diploma (n = 18)			
	Facility	0.431	.734
	Unit of work	1.455	.279
	Nursing Role	1.175	.336
	Certification	0.158	.697
	Years from Nursing School	.	.
	Previous QI training	0.460	.507
Associate (n = 78)			
	Facility	0.266	.850
	Unit of work	0.495	.856
	Nursing Role	1.608	.209
	Certification	0.356	.552
	Years from Nursing School	0.301	.876
	Previous QI training	0.350	.556
BSN (n = 201)			
	Facility	0.934	.425
	Unit of work	0.396	.922
	Nursing Role	1.853	.160
	Certification	2.593	.109
	Years from Nursing School	0.981	.419
	Previous QI training	0.237	.627
MS/ MSN (n = 49)			
	Facility	0.756	.524
	Unit of work	0.891	.533
	Nursing Role	1.155	.324

	Certification	0.480	.492
	Years from Nursing School *	3.026	.039
	Previous QI training	0.197	.659
Master's Other (n = 14)			
	Facility	1.722	.225
	Unit of work*	4.763	.024
	Nursing Role	2.410	.136
	Certification	0.243	.631
	Years from Nursing School	1.915	.193
	Previous QI training *	8.276	.014
Doctorate (n = 6)			
	Facility	1.316	.315
	Unit of work	.	.
	Nursing Role	0.208	.672
	Certification	0.008	.933
	Years from Nursing School	0.078	.927
	Previous QI training	.	.

*. The mean difference is significant at the .05 level

Appendix EE, Level of Education - Skills Proficiency/ Frequency

Table EE.1

Level of Education - Skills Proficiency/ Frequency

Level of Education - Skills Proficiency/Frequency			
Comparison to Facility, Unit of Work, Nursing Role, Certification, Years from Nursing School, Previous QI Training			
Level of Education	As compared to	F	Sig.
Diploma (n = 18)			
	Facility	0.943	.446
	Unit of work	0.770	.609
	Nursing Role	0.866	.441
	Certification	2.596	.127
	Years from Nursing School	.	.
	Previous QI training	2.244	.154
Associate (n = 78)			
	Facility	0.166	.919
	Unit of work	0.954	.479
	Nursing Role	0.053	.819
	Certification	0.751	.389
	Years from Nursing School	1.114	.357
	Previous QI training *	8.175	.005
BSN (n = 201)			
	Facility *	5.158	.002
	Unit of work	1.666	.109
	Nursing Role *	5.682	.004
	Certification	0.294	.588
	Years from Nursing School	0.061	.993
	Previous QI training *	23.587	< .001
MS/ MSN (n = 49)			
	Facility	1.460	.238
	Unit of work	0.697	.692
	Nursing Role	1.351	.269
	Certification	1.523	.223

	Years from Nursing School	1.547	.215
	Previous QI training *	7.653	.008
Master's Other (n = 14)			
	Facility	1.078	.402
	Unit of work	0.433	.782
	Nursing Role	1.136	.356
	Certification	0.736	.408
	Years from Nursing School	0.002	.998
	Previous QI training	1.231	.289
Doctorate (n = 6)			
	Facility*	8.265	.045
	Unit of work	3.405	.235
	Nursing Role	2.198	.212
	Certification	0.013	.914
	Years from Nursing School	0.947	.480
	Previous QI training	.	.

*. The mean difference is significant at the .05 level

Appendix FF, Level of Education - Attitude

Table FF.1

Level of Education - Attitude

Level of Education - Attitude			
Comparison to Facility, Unit of Work, Nursing Role, Certification, Years from Nursing School, Previous QI Training			
Level of Education	As compared to	F	Sig.
Diploma (n = 18)			
	Facility	0.058	.981
	Unit of work	0.404	.861
	Nursing Role	0.439	.653
	Certification	0.519	.482
	Years from Nursing School	.	.
	Previous QI training	0.086	.772
Associate (n = 78)			
	Facility	1.312	.277
	Unit of work *	2.096	.048
	Nursing Role	0.073	.788
	Certification	.717	.400
	Years from Nursing School *	4.736	.002
	Previous QI training	.405	.527
BSN (n = 201)			
	Facility	.354	.786
	Unit of work	1.151	.331
	Nursing Role	2.807	.063
	Certification	.128	.721
	Years from Nursing School	1.546	.190
	Previous QI training	1.596	.208
MS/ MSN (n = 49)			
	Facility	0.644	.591
	Unit of work	0.987	.460
	Nursing Role	0.100	.905

	Certification	0.239	.627
	Years from Nursing School	1.232	.309
	Previous QI training	1.609	.211
Master's Other (n = 14)			
	Facility	2.381	.131
	Unit of work	0.428	.785
	Nursing Role	0.087	.917
	Certification	.000	1.000
	Years from Nursing School	.786	.480
	Previous QI training	.659	.433
Doctorate (n = 6)			
	Facility	.143	.725
	Unit of work	.944	.551
	Nursing Role	2.042	.226
	Certification	.028	.876
	Years from Nursing School	.917	.489
	Previous QI training	.	.
*. The mean difference is significant at the .05 level			

Appendix GG, Unit of Work - QUISKA2

Table GG.1

Unit of Work - QUISKA2

Unit of Work - QUISKA2 (n = 73)			
Comparison to Facility, Nursing Role, Level of Education, Certification, Years from Nursing School, Previous QI Training			
Unit of Work	As compared to	F	Sig.
Medical Surgical (n = 93)			
	Facility	1.553	.206
	Nursing Role	1.476	.234
	Level of Education *	3.848	.003
	Certification *	4.414	.038
	Years from Nursing School	.942	.444
	Previous QI training *	10.467	.002
ICU/ SDU (n = 65)			
	Facility	0.796	.501
	Nursing Role *	9.407	< .001
	Level of Education *	6.621	< .001
	Certification *	5.112	.027
	Years from Nursing School	1.522	.218
	Previous QI training *	6.487	.013
Perioperative (n = 48)			
	Facility	1.281	.293
	Nursing Role	.712	.496
	Level of Education	2.060	.103
	Certification	.054	.817
	Years from Nursing School	1.134	.353
	Previous QI training *	8.145	.006
Emergency Care (n = 36)			
	Facility	0.433	.731
	Nursing Role *	8.754	.001
	Level of Education *	4.146	.014

	Certification	1.250	.271
	Years from Nursing School	.696	.600
	Previous QI training	0.624	.435
OB/GYN/NICU (n = 24)			
	Facility	0.633	.435
	Nursing Role *	3.678	.043
	Level of Education	1.357	.279
	Certification	.712	.408
	Years from Nursing School	.830	.522
	Previous QI training	2.741	.112
Pediatrics/Rehab/Psychiatric (n = 20)			
	Facility	.715	.503
	Nursing Role	.018	.895
	Level of Education	1.425	.272
	Certification	.154	.699
	Years from Nursing School	.307	.869
	Previous QI training	3.699	.070
Ambulatory (n = 24)			
	Facility	1.776	.184
	Nursing Role	.178	.677
	Level of Education *	4.291	.017
	Certification	1.390	.251
	Years from Nursing School	1.231	.325
	Previous QI training *	6.713	.017
Support-Quality/Education/Case Management (n = 24)			
	Facility	0.918	.450
	Nursing Role *	3.699	.042
	Level of Education	2.228	.096
	Certification	2.672	.116
	Years from Nursing School	0.107	.899
	Previous QI training	4.133	.054
Leadership (n = 32)			
	Facility	.174	.913
	Nursing Role *	4.885	.035
	Level of Education	1.834	.141
	Certification	.423	.521

Years from Nursing School	1.448	.250
Previous QI training *	13.023	.001

*. The mean difference is significant at the .05 level

Appendix HH, Unit of Work - Knowledge Subset

Table HH.1

Unit of Work - Knowledge Subset

Unit of Work - Knowledge			
Comparison to Facility, Nursing Role, Level of Education Certification, Years from Nursing School, Previous QI Training			
Unit of Work	As compared to	F	Sig.
Medical Surgical (n = 93)			
	Facility	0.441	.724
	Nursing Role	0.452	.638
	Level of Education	0.888	.493
	Certification	0.001	.980
	Years from Nursing School	0.476	.754
	Previous QI training	0.062	.804
ICU/ SDU (n = 65)			
	Facility	0.676	.570
	Nursing Role	1.631	.204
	Level of Education	1.994	.107
	Certification	.213	.646
	Years from Nursing School	2.435	.073
	Previous QI training	1.935	.169
Perioperative (n = 48)			
	Facility	.303	.823
	Unit of work	1.993	.148
	Level of Education	1.033	.401
	Certification	.070	.792
	Years from Nursing School	.300	.876
	Previous QI training	.837	.365
Emergency Care (n = 36)			
	Facility	1.136	.349
	Nursing Role	1.313	.283
	Level of Education	1.597	.209

	Certification	0.820	.372
	Years from Nursing School	0.137	.967
	Previous QI training	0.101	.753
OB/GYN/NICU (n = 24)			
	Facility	0.146	.706
	Unit of work	0.754	.483
	Level of Education	1.320	.288
	Certification	.057	.813
	Years from Nursing School	.742	.575
	Previous QI training	.319	.578
Pediatrics/Rehab/Psychiatric (n = 20)			
	Facility	1.717	.210
	Nursing Role	.438	.517
	Level of Education	.057	.981
	Certification	.367	.552
	Years from Nursing School	1.093	.395
	Previous QI training	.082	.778
Ambulatory (n = 24)			
	Facility	.548	.655
	Nursing Role	1.372	.254
	Level of Education	2.613	.080
	Certification	.326	.574
	Years from Nursing School	.526	.669
	Previous QI training	1.395	.250
Support-Quality/Education/Case Management (n = 24)			
	Facility	0.674	.578
	Nursing Role	0.613	.551
	Level of Education	0.337	.884
	Certification	2.301	.144
	Years from Nursing School	1.767	.195
	Previous QI training	3.173	.089
Leadership (n = 32)			
	Facility	.954	.423
	Nursing Role *	5.444	.027
	Level of Education	1.126	.372
	Certification	1.216	.279

	Years from Nursing School	.627	.604
	Previous QI training	.040	.844
*. The mean difference is significant at the .05 level			

Appendix II, Unit of Work - Skills Critical Thinking Subset

Table II.1

Unit of Work - Skills Critical Thinking Subset

Unit of Work - Skills Critical Thinking			
Comparison to Facility, Nursing Role, Level of Education, Certification, Years from Nursing School, Previous QI Training			
Unit of Work	As compared to	F	Sig.
Medical Surgical (n = 93)			
	Facility	0.344	.794
	Nursing Role	0.766	.468
	Level of Education	1.083	.375
	Certification	1.754	.189
	Years from Nursing School	0.696	.597
	Previous QI training	0.104	.748
ICU/ SDU (n = 65)			
	Facility	0.388	.762
	Nursing Role *	4.325	.017
	Level of Education*	3.838	.008
	Certification	1.031	.314
	Years from Nursing School *	3.606	.018
	Previous QI training *	6.928	.011
Perioperative (n = 48)			
	Facility	0.547	.653
	Nursing Role	1.132	.331
	Level of Education	1.556	.203
	Certification	0.357	.553
	Years from Nursing School	0.809	.526
	Previous QI training	1.087	.303
Emergency Care (n = 36)			
	Facility	0.140	.935
	Nursing Role	0.349	.708
	Level of Education	0.248	.862

	Certification	1.795	.189
	Years from Nursing School	0.425	.790
	Previous QI training	0.332	.568
OB/GYN/NICU (n = 24)			
	Facility	0.546	.468
	Nursing Role	2.348	.120
	Level of Education *	5.617	.011
	Certification	0.474	.498
	Years from Nursing School	0.294	.878
	Previous QI training	0.040	.844
Pediatrics/Rehab/Psychiatric (n = 20)			
	Facility	1.138	.344
	Nursing Role	0.470	.502
	Level of Education	0.837	.493
	Certification	0.002	.962
	Years from Nursing School	0.782	.554
	Previous QI training	0.019	.893
Ambulatory (n = 24)			
	Facility	0.685	.571
	Nursing Role	2.309	.143
	Level of Education	2.277	.111
	Certification	0.808	.378
	Years from Nursing School	0.092	.963
	Previous QI training	0.108	.746
Support-Quality/Education/Case Management (n = 24)			
	Facility	2.749	.070
	Nursing Role	0.695	.510
	Level of Education	0.277	.920
	Certification	0.867	.362
	Years from Nursing School	0.207	.815
	Previous QI training	4.094	.055
Leadership (n = 32)			
	Facility	0.784	.513
	Nursing Role	0.000	1.000
	Level of Education	1.087	.391
	Certification	0.249	.621

Years from Nursing School	0.261	.853
Previous QI training	0.092	.763

*. The mean difference is significant at the .05 level

Appendix JJ, Unit of Work - Skills Proficiency/Frequency Subset

Table JJ. 1

Unit of Work - Skills Proficiency/Frequency Subset

Unit of Work - Skills Proficiency/Frequency			
Comparison to Facility, Nursing Role, Level of Education, Certification, Years from Nursing School, Prior QI Training			
Unit of Work	As compared to	F	Sig.
Medical Surgical (n = 93)			
	Facility	1.640	.186
	Nursing Role	1.184	.311
	Level of Education *	4.629	.001
	Certification *	6.101	.015
	Years from Nursing School	0.685	.604
	Previous QI training *	13.802	<.001
ICU/ SDU (n = 65)			
	Facility	0.726	.540
	Nursing Role *	8.003	.001
	Level of Education *	5.606	.001
	Certification *	4.499	.038
	Years from Nursing School	.922	.436
	Previous QI training *	5.772	.019
Perioperative (n = 48)			
	Facility	1.274	.295
	Nursing Role	.539	.587
	Level of Education	1.965	.117
	Certification	.001	.980
	Years from Nursing School	1.380	.257
	Previous QI training *	7.583	.008
Emergency Care (n = 36)			
	Facility	0.354	.787
	Nursing Role *	7.311	.002

	Level of Education *	3.670	.022
	Certification	0.867	.358
	Years from Nursing School	0.817	.524
	Previous QI training	0.434	.514
OB/GYN/NICU (n = 24)			
	Facility	0.511	.482
	Nursing Role	3.106	.066
	Level of Education	1.072	.360
	Certification	.799	.381
	Years from Nursing School	.693	.606
	Previous QI training	2.250	.148
Pediatrics/Rehab/Psychiatric (n = 20)			
	Facility	.654	.532
	Nursing Role	.056	.816
	Level of Education	1.724	.202
	Certification	.249	.624
	Years from Nursing School	.251	.905
	Previous QI training *	4.600	.046
Ambulatory (n = 24)			
	Facility	1.990	.148
	Nursing Role *	.136	.715
	Level of Education *	4.228	.018
	Certification	1.805	.193
	Years from Nursing School	1.423	.266
	Previous QI training *	8.163	.009
Support-Quality/Education/Case Management (n = 24)			
	Facility	1.990	.148
	Nursing Role *	3.930	.035
	Level of Education	2.293	.089
	Certification	2.217	.151
	Years from Nursing School	.097	.908
	Previous QI training	3.352	.081
Leadership (n = 32)			
	Facility	.809	.504

Nursing Role *	5.040	.032
Level of Education	1.861	.136
Certification	.447	.509
Years from Nursing School	1.349	.279
Previous QI training *	14.610	.001

*. The mean difference is significant at the .05 level

Appendix KK, Unit of Work - Attitude Subset

Table KK.1

Unit of Work - Attitude Subset

Unit of Work -Attitude			
Comparison to Facility, Nursing Role, Level of Education, Certification, Years from Nursing School, Previous QI Training			
Unit of Work	As compared to	F	Sig.
Medical Surgical (n = 93)			
	Facility	0.118	.949
	Nursing Role	0.491	.614
	Level of Education	0.190	.966
	Certification	0.668	.416
	Years from Nursing School	1.891	.119
	Previous QI training	0.011	.915
ICU/ SDU (n = 65)			
	Facility	0.397	.755
	Nursing Role	2.137	.127
	Level of Education	0.737	.571
	Certification	1.459	.232
	Years from Nursing School	2.322	.084
	Previous QI training	0.059	.809
Perioperative (n = 48)			
	Facility	1.517	.223
	Nursing Role	0.874	.424
	Level of Education	0.960	.439
	Certification	3.454	.070
	Years from Nursing School	1.813	.144
	Previous QI training *	8.834	.005
Emergency Care (n = 36)			
	Facility	0.191	.902
	Nursing Role	0.843	.439

	Level of Education	0.344	.794
	Certification	0.041	.840
	Years from Nursing School	1.030	.407
	Previous QI training	0.097	.758
OB/GYN/NICU (n = 24)			
	Facility	0.136	.716
	Nursing Role	0.317	.732
	Level of Education	0.098	.907
	Certification	0.314	.581
	Years from Nursing School *	3.647	.023
	Previous QI training *	5.878	.024
Pediatrics/Rehab/Psychiatric (n = 20)			
	Facility	0.649	.535
	Nursing Role	0.850	.369
	Level of Education	1.581	.233
	Certification	0.006	.940
	Years from Nursing School	0.768	.563
	Previous QI training	0.075	.787
Ambulatory (n = 24)			
	Facility	0.181	.177
	Nursing Role	0.081	.779
	Level of Education	0.785	.516
	Certification	0.003	.958
	Years from Nursing School	0.352	.788
	Previous QI training	0.078	.783
Support-Quality/Education/Case Management (n = 24)			
	Facility	0.821	.498
	Nursing Role	0.638	.538
	Level of Education	0.595	.704
	Certification	1.943	.177
	Years from Nursing School	1.628	.220
	Previous QI training	1.645	.213

Leadership (n = 32)			
	Facility	0.796	.506
	Nursing Role	1.789	.191
	Level of Education *	3.834	.014
	Certification	0.810	.374
	Years from Nursing School	2.431	.086
	Previous QI training	0.331	.569
*. The mean difference is significant at the .05 level			

Appendix LL, Prior QI Training Comparison to Years from Nursing School

Table LL.1

Prior QI Training Comparison to Years from Nursing School

Prior QI Training Comparison to Between Years from Nursing School						
Years from nursing school (I)	As compared to (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
<2 years	2-5 years	-.03	.136	1.000	-.41	.36
	6-10 years	.15	.133	1.000	-.23	.53
	11-20 years	.22	.131	.885	-.15	.59
	>20 years	.43*	.124	.006	.08	.78
2-5 years	<2 years	.03	.136	1.000	-.36	.41
	6-10 years	.18	.091	.550	-.08	.43
	11-20 years	.25*	.087	.046	.00	.49
	>20 years	.45*	.077	.000	.23	.67
6-10 years	<2 years	-.15	.133	1.000	-.53	.23
	2-5 years	-.18	.091	.550	-.43	.08
	11-20 years	.07	.082	1.000	-.16	.31
	>20 years	.28*	.071	.001	.08	.48
11-20 years	<2 years	-.22	.131	.885	-.59	.15
	2-5 years	-.25*	.087	.046	-.49	.00
	6-10 years	-.07	.082	1.000	-.31	.16
	>20 years	.20*	.066	.022	.02	.39
>20 years	<2 years	-.43*	.124	.006	-.78	-.08
	2-5 years	-.45*	.077	.000	-.67	-.23
	6-10 years	-.28*	.071	.001	-.48	-.08
	11-20 years	-.20*	.066	.022	-.39	-.02
Based on observed means. The error term is Mean Square (Error) = .224. *. The mean difference is significant at the .05 level.						